AUGUST 30, 1954

How the Russians Run Railroads . . . p. 24

RAILWAY AGE

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IN THIS ISSUE:

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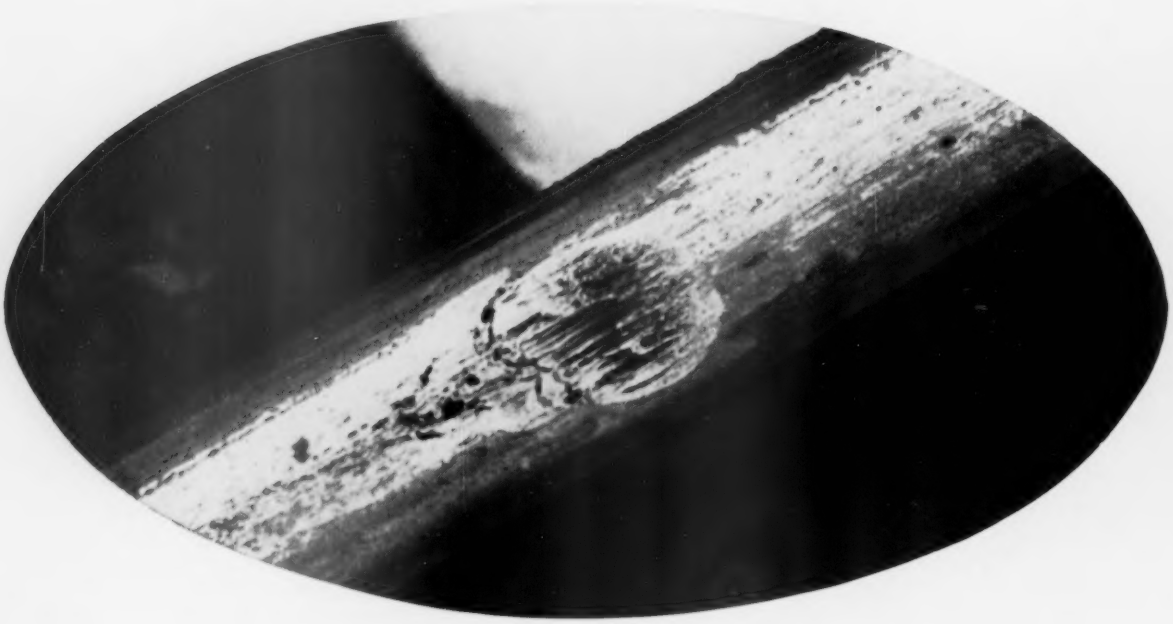

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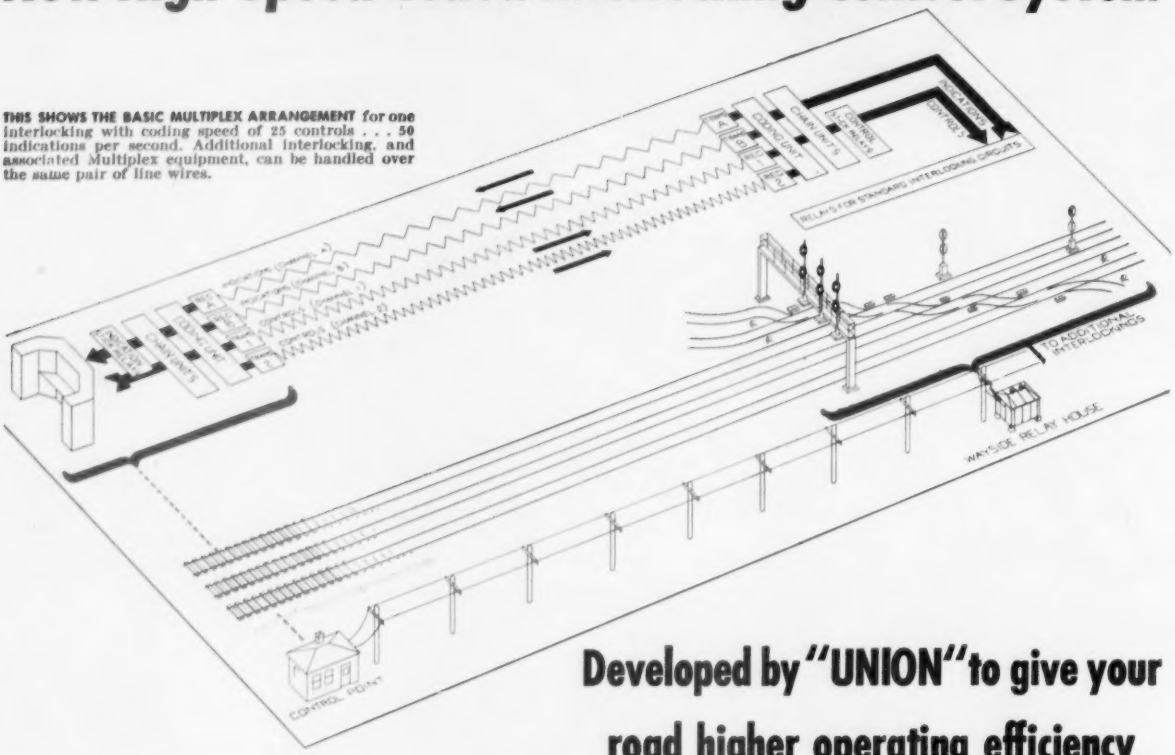

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August 30, 1954 **Vol. 137, No. 9**

Week at a Glance

Railroads fared badly in the Congress which has just adjourned; their only important "break" was elimination, in the new tax code, of some previously existing inequities. 6

Human misery is never pleasant. But that only makes this "box score" more significant:

	Derailment of Santa Fe "Chief," August 22	Crash of Braniff air liner, August 22
Persons aboard	235*	19
Deaths	4	11
Injuries	50	8
Total casualties	54	19
Percentage	23	100

*Passengers only.

8

Interstate Commerce Commissioner Owen Clarke thinks the commission might well make greater use of Interstate Commerce Act provisions calling for cooperation with state commissions in railroad cases. He also thinks state commission are failing in their duty by not participating in motor carrier cases to the extent contemplated by the Motor Carrier Act. 9

Good news for suppliers is the sudden upsurge of freight car orders. This week's Equipment & Supplies column reports orders for 2,644 cars, divided by four railroads and a steel company among four builders and a railroad shop. 10

Fitted bearings reduce hot boxes 27 to 1, according to current AAR tests being run on 1,000 refrigerator cars. 12

FORUM: Studebaker workers "saw the light" in the settlement of their recent wage dispute when the union and management explored their common interests. Would this method work in the railroad industry? 14

"Inherent advantages"—what they are, how they're at-

Current Statistics

Operating revenues, six months	
1954	$ 4,609,299,381
1953	5,327,263,239
Operating expenses, six months	
1954	$ 3,697,687,869
1953	4,022,941,871
Taxes, six months	
1954	$ 441,829,475
1953	642,493,641
Net railway operating income, six months	
1954	$ 345,222,857
1953	548,668,653
Net income, estimated, six months	
1954	$ 224,000,000
1953	418,000,000
Average price railroad stocks	
August 24, 1954	70.83
August 25, 1953	61.32
Carloadings, revenue freight	
Thirty-three weeks, 1954	20,964,472
Thirty-three weeks, 1953	24,277,297
Average daily freight car surplus	
Week ended Aug. 21, 1954	79,891
Week ended Aug. 22, 1953	18,473
Average daily freight car shortage	
Week ended Aug. 21, 1954	332
Week ended Aug. 22, 1953	2,718
Freight cars delivered	
July 1954	1,801
July 1953	6,370
Freight cars on order	
August 1, 1954	12,889
August 1, 1953	47,423
Freight cars held for repairs	
July 1, 1954	120,104
July 1, 1953	95,768
Average number of railroad employees	
Mid-July 1954	1,077,909
Mid-July 1953	1,239,433

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Departments

Week at a Glance CONTINUED

BRIEFS

Closing date for the New York Railroad Club's 6th annual prize essay contest is October 1.

Purchase of a big independent motor trucking company is reported to be in the offing for the Southern Pacific. Pacific Motor Trucking Company, which now operates more than 12.3 thousand route-miles (compared with its parent railroad's 12.4 thousand route-miles of rail line) is said to be negotiating for purchase of Pacific Freight Lines, of Los Angeles. PFL operates 1,391 units of equipment and has annual revenues of about $12 million. It has routes from Tucson, Ariz., to the San Francisco Bay area and Sacramento.

Formal dedication of Radnor yard, new $14-million facility of the Louisville & Nashville and the Nashville, Chattanooga & St. Louis at Nashville, Tenn., will take place September 22.

AIR COSTS MONEY!

Stop leakage with new WABCOSEAL® Angle Cocks

BRAKE pipe leakage increases compressor operation, lowers its efficiency and causes difficult train handling. Reduce leakage to the minimum by installing the *new* Wabcoseal Angle Cock shown here. Two styles are available—with or without spring-locking handle.

Heart of the new Wabcoseal Angle Cocks is the sealed key that stays tight through a wide degree of key wear. A Wabco compression ring replaces the standard tapped thread at the brake pipe end to give a positive seal. Also, adequate end tolerance is provided so brake pipe nipple need not be cut to precise length.

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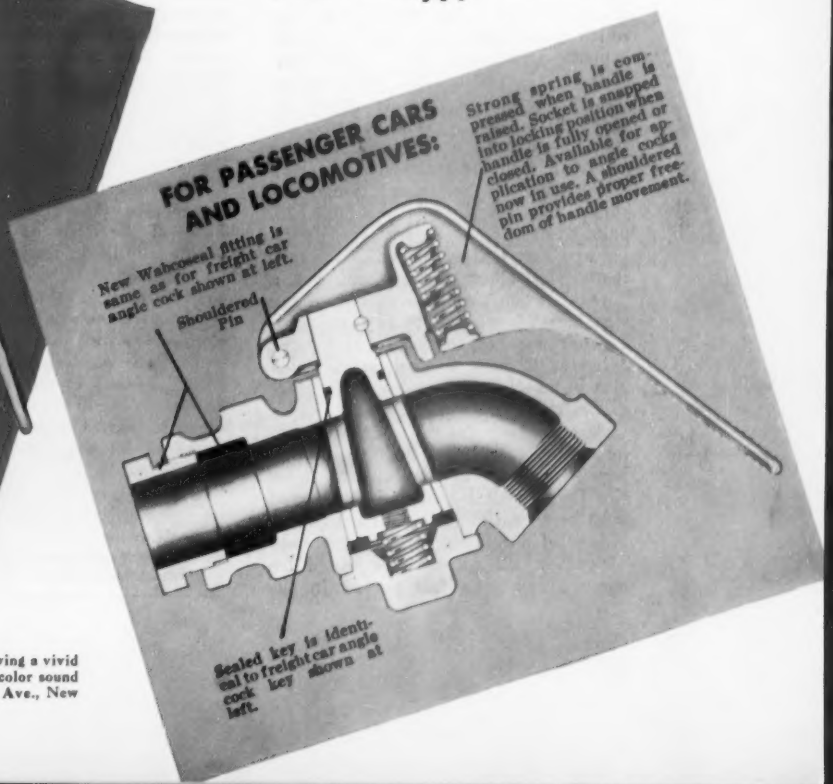


NEW MOVIE AVAILABLE entitled, *"AT THIS MOMENT"*—showing a vivid story of modern railroad progress. Length 26 minutes, on 16 mm. color sound film. For use of film write: United World Films, Inc., 1445 Park Ave., New York or Association Films, Inc., 347 Madison Ave., New York.

Railroads Fared Badly in Congress

St. Lawrence seaway and retirement system liberalizers approved, while "time-lag" bill died, in session which adjourned August 20

The railroads fared badly in the eighty-third Congress' second and last regular session, which adjourned August 20.

The session brought enactment of legislation providing for United States participation with Canada in construction of the St. Lawrence seaway, which the railroads opposed, and death to the top railroad proposal—the "time-lag" bill, which was designed to insure prompt increases in carrier rates as costs rose. Since it was the Congress' final adjournment (in the absence of a special session) all pending legislation on which no final action was taken died with the session.

Retirement Act Liberalizers — Other setbacks for the railroads came in enactment, over their opposition, of amendments, sponsored by railroad labor organizations, to the Railroad Retirement and Railroad Unemployment Insurance Acts. Among such amendments were those embodying railroad labor's program for liberalizing the acts. This legislation, carried in House Bill 7840, was passed by the Senate the day before the session ended, the favorable House action having come July 30. The bill had not been acted upon by President Eisenhower when this issue went to press.

Another retirement-act liberalizer, enacted earlier in the session, was that which repealed the act's so-called dual-benefits restriction. That restriction, added to the act in 1951, had required that a pension or annuity based on untaxed railroad service before 1937 must be reduced if the annuitant was receiving (or was entitled to receive) old-age benefits under the Social Security Act (*Railway Age*, June 28, page 8).

Fare Tax Cut—Meanwhile, the railroads and other carriers did get a "break" when the passenger fare tax went down from 15% to 10% on April 1. That was not special relief for the carriers; it came in legislation which also put a 10% ceiling on many other excise taxes.

Also enacted was the so-called omnibus tax law which effected a comprehensive revision of the Internal Revenue Code. This legislation as reported elsewhere on this page, has many provisions of special interest to railroads.

Section 22 quotations would become firmer if a bill passed in the session's closing days is approved by President Eisenhower. The bill, S.906, would preclude the filing by the government of complaints assailing, as unreasonable, rates granted by carriers to government agencies pursuant to the Interstate Commerce Act's Section 22. The final version of the legislature, however, included a provision giving the government two years within which to assail section 22 rates contracted for "during a national emergency declared by Congress."

Other legislation enacted during the session included an act which gives the postmaster general full discretion to substitute highway post office operations for railway mail services (*Railway Age*, June 28, page 8). Also, there was the highway act, which put federal highway aid to states on a record basis of $875 million annually for the 1956 and 1957 fiscal years; and the omnibus rivers and harbors and flood control bill, awaiting Presidential action, which would authorize projects expected to cost more than $1 billion, including more than $300 million for rivers and harbors works.

Trip-Lease Bill Died—The railroads did get something like *quid pro quo* to offset their loss of the time-lag bill. Dead with that measure is the trip-lease bill, which would have ended the Interstate Commerce Commission's power to prohibit trip-leasing of motor trucks.

The railroad opposed the trip-lease bill, and that bill's proponents marshalled enough votes to retaliate by having the time-lag bill recommitted to the Senate Committee on Interstate Commerce.

That committee had already reported the time-lag bill to the Senate with a recommendation that it pass. After the recommittal, the committee left both time-lag and trip-lease pigeonholed.

NEW TAX CODE WILL BENEFIT RAILROADS

The new "Internal Revenue Code of 1954," recently passed by Congress and signed by President Eisenhower, contains a number of provisions which will be of direct benefit to railroads, by eliminating some of the inequities included in tax laws which the new code supersedes. In addition, a number of provisions considered by Congress which would have adversely affected railroads were eliminated from the code prior to its passage.

Included provisions which are expected to be of particular benefit are:

- **Elimination of the 2% penalty for filing consolidated corporate income tax returns.**
- **Reduction, from 95% to 80%, of the stock ownership requirement for filing consolidated returns.**
- **Elimination of the "pyramiding" of lessor income taxes. (Many railroad leases require that the lessee pay the lessor's income tax. Under the old code, such payments were considered as additional income to the lessor, and were in turn subject to taxation, *ad infinitum*. Under the new code, payment by the lessee of a lessor's income tax will not be included in the lessor's gross income, nor treated as a deduction by the lessee.)**
- **"Pay-as-you-go" provisions for installment payment of taxes.**
- **More equitable treatment for dividends received and for deductions for net operating losses.**
- **Optional changes in methods of calculating depreciation, under which higher charges may be taken during the first part of an asset's estimated useful life.**
- **Extension through 1955 of a provision which excludes from gross income gain attributable to discharge of indebtedness in railroad receivership or Section 77 proceedings.**
- **Some additional tax deductions which may be carried over from a transferor corporation to a successor corporation in certain tax-free reorganizations.**
- **Provision for a basis of zero in the case of property, other than money, acquired from a non-stockholder as a contribution to capital.**

Adverse provisions eliminated from the code before its enactment, or modified, related to disallowance of deduction of interest on income bonds; treatment as taxable income to the recipient of new securities issued in reorganization proceedings and assignable to arrearages of dividends on preferred stock or to accrued unpaid interest on bonds; an 85% penalty on redemption of preferred stock or income or debenture bonds; and mandatory accrual of real estate taxes.

Among other actions of the Congress were enactments of the usual appropriation bills for the current fiscal year ending June 30, 1955. Included were appropriations of $11,284,000 for the ICC, and $1,064,000 for the National Mediation Board and National Railroad Adjustment Board.

Presidential appointments confirmed during the session included that of Commissioner John H. Winchell of the ICC; the appointment of Robert O. Boyd to membership on NMB; and the reappointments of Frank C. Squire and Horace W. Harper to the Railroad Retirement Board.

A principal proponent of legislation favored by railroad labor organizations —Representative Robert Crosser, Democrat of Ohio—will not be a member of the eighty-fifth Congress which convenes next January. Mr. Crosser was defeated for renomination in Ohio's primary. He was chairman of the House Committee on Interstate & Foreign Commerce during the eighty-first and eighty-second Congresses, when the Democrats were in control.

Labor & Wages

Non-Op Case Is Settled

But some southeastern carriers have taken exception to compulsory features of the agreement and will negotiate them further

Agreement in the long-drawn-out non-operating unions' "fringe benefit" case was reached in Chicago August 21.

The agreement includes a health and welfare plan, holiday pay, and extended vacations, as well as a number of working rules changes which the carriers had counter-proposed. It covers carriers represented by the regional carriers' conference committees. However, 11 southeastern roads and three southeastern terminal companies have taken exception to compulsory features of health and welfare phases of the agreement, and these may be subject to further negotiation on those individual properties.

Altogether, the agreement covers about 900,000 non-operating employees, principally on Class I roads. It has been estimated by carrier spokesmen that the settlement will add about $140 million a year to the industry's operating costs.

In a statement issued following completion of the agreement, carrier spokesmen said the settlement was based on the May 15 recommendations of President Eisenhower's fact-finding board (*Railway Age*, May 24, page 37). "In accordance with the Presidential board's recommendations," the statement said, "the health and welfare plan will provide hospital, medical and surgical insurance coverage for all non-operating employees. The insurance premiums will be shared on a 50-50 basis by employees and railroads.

"Tonight's agreement provides that each employee will contribute $3.40 a month and the carriers a like amount per employee, for health and welfare insurance. On railroads where there are hospital associations, health and welfare provisions of today's agreement provide that carriers and employees will make equal contributions toward maintenance of the hospital associations."

Holiday provisions of the new agreement retroactive to May 1, calls for non-operating employees to be paid for seven recognized holidays. Hourly rated employees will receive straight time pay for holidays *not* worked, if the holiday falls on a day they are regularly assigned to work. If the employee is required to work on such a holiday, he will receive time and one-half pay *in addition* to his regular straight-time pay. Monthly-rated employees regularly assigned to work a five-day week will have their pay recomputed to add seven days pay per year. Other employees working on a monthly basis will have 28 hours pay a year added to their salaries.

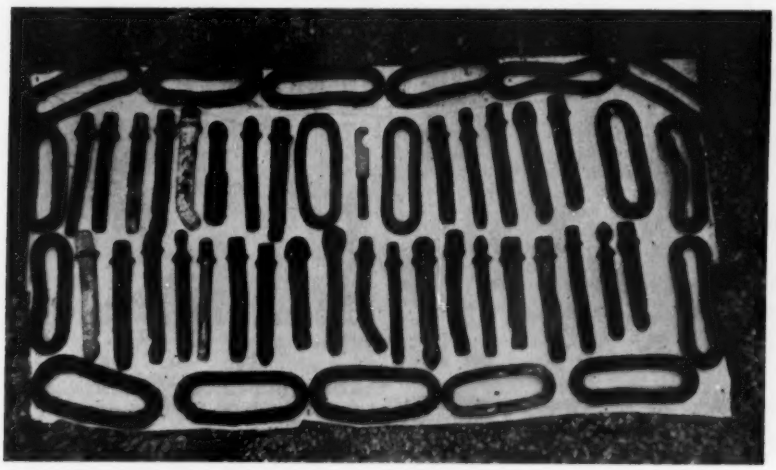
Vacations will be extended to three weeks (adjusted from last January 1) for employees with 15 or more years of service.

Working rule changes provide for a time limit within which claims arising from alleged violations of working rules may be filed. Carriers will be allowed to use furloughed employees for extra and relief work; and to lay off employees on short notice when all or portions of a railroad are shut down for emergencies such as floods, storms and strikes.

Exception to compulsory features of the agreement and to the idea of a national fund with which to spread the insurance risk for health and welfare benefits, was taken by the Central of Georgia; Gulf, Mobile & Ohio; Atlantic Coast Line; Atlanta & West Point; Western of Alabama; Charleston & Western Carolina; Clinchfield; Georgia; Louisville & Nashville; Nashville, Chattanooga & St. Louis; Richmond, Fredericksburg & Potomac; Atlanta Joint Terminals; Richmond Terminal, and Potomac Yard. On these properties, individual negotiations over excepted provisions of the agreement may be conducted later.

Originally, the demands were served by 15 non-operating unions. However, during the negotiations, the Hotel & Restaurant Employees & Bartenders Union dropped out of the case, choosing to accept, instead, the "trainman" package settlement.

Court Case—Unless further carrier action is initiated, it is doubtful that court review of the carriers' position in negotiating health and welfare benefits under the Railway Labor Act will now take place. Originally, the carriers had sought declaratory judgment in federal district court, maintaining that union demands for free transportation and health and welfare benefits were not within the scope of the act and



LINK AND PIN COUPLER collection donated to the Kansas City Museum by Homer M. Riggs, a Frisco engineman. Many of the items were unearthed in a Frisco yard in Kansas City by the 1951 flood.

thus not a proper subject for negotiation. Carrier appeal of dismissal of their suit (last February by Federal District Judge Win G. Knoch) resulted in the Seventh District U.S. Court of Appeals remanding the case back to a lower court for trial. No disposition of the case has yet been announced. And since the agreement would now be binding, regardless of a court decision (because the court would only review the carriers' rights in negotiations), it appears doubtful that the matter will be progressed further.

Figures of the Week

Freight Car Loadings

Loadings of revenue freight in the week ended August 21 totaled 678,624 cars, the Association of American Railroads announced on August 26. This was a decrease of 6,653 cars, or 1.0 per cent, compared with the previous week; a decrease of 138,822 cars, or 17.0 per cent, compared with the corresponding week last year; and a decrease of 155,605 cars, or 18.7 per cent, compared with the equivalent 1952 week.

Loadings of revenue freight for the week ended August 14 totaled 685,277 cars; the summary, compiled by the Car Service Division, AAR follows:

REVENUE FREIGHT CAR LOADINGS
For the week ended Saturday, August 14

District	1954	1953	1952
Eastern	107,668	136,414	129,697
Allegheny	123,550	158,579	160,241
Pocahontas	50,285	61,468	59,533
Southern	113,931	123,515	125,508
Northwestern	118,518	144,081	148,470
Central Western	116,028	123,764	122,533
Southwestern	55,297	59,801	59,774
Total Western Districts	289,843	327,646	330,777
Total All Roads	685,277	807,622	805,756
Commodities:			
Grain and grain products	55,436	50,447	50,085
Livestock	7,139	6,971	7,325
Coal	112,666	135,538	144,458
Coke	6,880	12,666	12,872
Forest products	39,171	47,213	48,845
Ore	64,132	94,209	95,346
Merchandise l.c.l.	62,829	70,852	72,510
Miscellaneous	337,024	389,726	374,315
August 14	685,277	807,622	805,756
August 7	667,592	785,349	781,648
July 31	683,569	793,754	733,076
July 24	684,287	780,699	607,190
July 17	694,545	791,414	609,000
Cumulative total, 33 weeks	20,964,472	24,277,297	23,092,473

Operations

Believe Broken Equalizer Caused "Chief" Derailment

Preliminary investigation into the cause of derailment of the Santa Fe's "Chief" at Lomax, Ill., on August 22, has indicated that the accident was

caused by a broken equalizer in the rear truck of the forward lounge car.

The train, westbound from Chicago to Los Angeles, left the rails just east of Lomax and grazed a string of refrigerator cars on an adjacent siding. Four passengers were killed and approximately 50 were hurt, although many of the latter received only minor injuries and were treated at the scene of the accident. Most of the casualties were passengers in the first coach, which became uncoupled and struck the refrigerator cars in such a manner that it reversed itself and also rolled over.

The "Chief" was carrying about 235 passengers. Most of the 13 cars remained upright and the diesel units and head-end cars remained on the rails. The uninjured passengers continued their journey aboard another train about five hours after the accident.

Safety

AAR Studying Track-Car Safety

ICC requested that consideration be given to matter—Commission is also seeking means of overcoming failure of some equipment to properly shunt track circuits

Meeting a request of the Interstate Commerce Commission, the Association of American Railroads is giving consideration to operating-practice changes designed to insure greater safety to maintenance forces riding on track motor cars. Meanwhile, the commission has its own staff considering means of insuring that track circuits which activate signals are properly shunted by lightweight, self-propelled cars.

These activities were discussed by Commissioner Owen Clarke in an address before the Brotherhood of Railroad Signalmen at Chicago August 18. Mr. Clarke also made another Chicago address the same week, speaking August 17 before a meeting of the Public Utility Law Section of the American Bar Association. There he discussed the railroad problem of getting state commissions to permit abandonment of unprofitable passenger service, favoring voluntary federal-state cooperation over proposed legislation authorizing the ICC to override state commissions.

Action needed to insure safer operation of track motor cars "is being given serious consideration by the commission," Commissioner Clarke told the signalmen. He added that the commission requested the AAR to give the matter "prompt consideration" because it is "primarily a problem in railroad operation."

The AAR's study is being made by a committee of the Operations and Maintenance Department. The commission will be given the benefit of the committee's findings, Mr. Clarke said. He also said "the frequency of accidents involving track cars . . . clearly indicates that corrective measures in connection with their operation should be considered without further delay."

As to track-circuit shunting, Mr. Clarke said the need for the commission's investigations was pointed up by an accident which occurred November 23, 1953, at Springfield, Mass. He added:

"The false proceed signal indication which caused this rear-end collision was due to a failure of a lightweight, self-propelled car to properly shunt a track circuit. The use of disc brakes, instead of wheel brakes, on these cars, and the excessive use of sand in starting and stopping, present serious problems in connection with track circuit shunting, which deserve the serious attention of not only those who are especially interested in railway signaling, but also railroad officers who are concerned with and responsible for safety of railroad operations.

"We are also keeping in touch with such new developments as the proposed 'Train X' and trains of the 'Talgo' type where use of so-called free wheels may be involved. Should use of stationary axles and free wheels, with roller or ball bearings, become a reality on trains operating in territory where interlockings, automatic block or traffic control systems are in service, you gentlemen know well the signaling problems that will arise."

Deficit Train Problem—The cooperative approach to the deficit train problem, which Mr. Clarke had in mind in his talk to the bar association group, is being pursued by a joint committee of the ICC and the National Association of Railrad & Utilities Commissioners. Of that undertaking, the commissioner had this to say:

"As a result of their efforts, substantial progress has been made in removing trains where revenues fail to cover crew wages, fuel, locomotive and car repairs, lubricants and train supplies and expenses. The extensive studies of this committee have been helpful not only to regulatory bodies but also to railroad management. Certainly, here is a prime example of effective coordination and cooperation in transport regulation."

As to proposed legislation which would give the ICC authority to override state commissions in train-abandonment cases, Mr. Clarke said the proposal "is in sharp contrast to the railroads' general view that there should be less federal regulation." He went on to refer to recent contentions to the effect that the Interstate Commerce Act's present section 13 (4) provides a remedy; and to the ICC's pending investigation, under that section, of the New Jersey commission's refusal to permit abandonment of a train operated on the New Jersey & New York (*Railway Age*, July 19, page 11).

"This proceeding presents a novel and interesting legal question, as to which, of course, I can express no personal opinion at this time," Commissioner Clarke added.

87 KILLED IN TRACK-CAR ACCIDENTS OF PAST DECADE

The Interstate Commerce Commission's latest tally of fatalities and injuries in track-car accidents of the past decade was made last month in Accident Report No. 3575. The report was by Commissioner Clarke.

"Since January 1, 1944," it said, "the commission has investigated 50 collisions . . . which were caused by failure to provide adequate protection for the movement of track motor cars. These accidents resulted in the death of 87 persons and the injury of 146 persons. In the reports covering the investigations . . . the commission repeatedly has recommended that the carriers take measures to provide adequate protection for the movement of track motor cars. . . ."

Equipment & Supplies

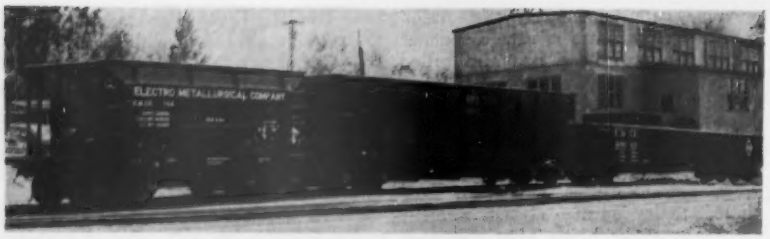
LOCOMOTIVES

Locomotive Installations

Class I railroads placed 842 new locomotive units in service in the first seven months of 1954, the Association of American Railroads has announced. Of that number, 832 were diesel-electric units and the other 10 were gas turbine-electric units. In the same period in 1953, Class I railroads put in service 1,409 new locomotive units, of which 1,398 were diesel-electric, 10 steam and one gas turbine-electric.

Class I railroads installed 54 new locomotive units in July this year; 51 were diesel-electric, and three were gas turbine-electric units. In July 1953, they installed 113 locomotive units, of which 112 were diesel-electric and one steam.

Class I railroads, on August 1, 1954, had 133 new locomotive units on order. These included 118 diesel-electric, 10 electric, and five gas turbine-electric units. Class I railroads on August 1, 1953, had 516 new locomotive units on order, including 484 diesel-electric, five



THESE THREE EXAMPLES of modern railroad car building were displayed at a recent "open house" at the Greenville, Pa., plant of the Greenville Steel Car Company. From left to right are a 70-ton hopper car for intraplant service; a 70-ton triple hopper for heavy general mill yard service; and a 70-ton steel gondola—one of 300 built for the Erie.

steam, 10 electric, and 17 gas turbine-electric.

FREIGHT CARS

The **Bangor & Aroostook** has ordered from the Pacific Car & Foundry Co. 350 50-ton refrigerator cars, to be delivered in March and April 1955, and to cost an estimated $3,500,000. Decision to purchase these cars was reported in *Railway Age* July 5, page 11. Their delivery will increase the B&A's total ownership of refrigerator cars to 1,480, plus 450 insulated box cars—a total ownership of 1,930 insulated cars. "It is believed," the road told *Railway Age*, that this constitutes "the second largest railroad owned and operated insulated car fleet in the United States."

The **Columbia Geneva Steel Company** has ordered nine 90-ton gondola cars from the Thrall Car Manufacturing Company.

The **New Haven** has ordered from the Pullman-Standard Car Manufacturing Company 85 covered hopper cars, of 2,007 cu ft capacity, and costing approximately $8,000 each.

The **Southern Pacific** has received authority from its directors to build an additional 1,500 box cars in company shops. Most of the cars will have 15-ft doors to permit easier loading and unloading of lumber.

The **Union Pacific** has ordered from ACF Industries, Inc., 200 70-ton, 19,000-gal roller-bearing tank cars, to be built at Milton, Pa.; and from Pullman-Standard Car Manufacturing Company, 300 automobile cars and 200 box cars. All the cars to be built by Pullman will be of 50 tons capacity, and have an inside length of 50½ ft. The box cars will have cushion-type underframes; and be fitted along each interior side wall with five horizontal belt rails into which cross bars can be inserted for bulkheading and compartmenting cargo. Delivery of the new cars is scheduled to begin late this year, and to be completed within a few months thereafter. Their total cost is estimated at $7,000,000. A UP inquiry for 500 50-ton box cars, 200 70-ton tank cars, and 300 50-ton tank cars was reported in *Railway Age* July 19, page 10.

Organizations

Seventy-one scholarships in a new course in transportation and traffic management have been offered by the **Milwaukee Traffic Club,** the **Transportation Club of Milwaukee** and the **Women's Traffic Club,** in cooperation with the University of Wisconsin, Milwaukee Extension division. The awards are open to anyone already employed in the traffic and transportation field, or who wishes to enter it. Application may be made to the Milwaukee Traffic Club, Box 1461, Milwaukee 1, before September 7.

Securities

Authorizations

CENTRAL OF GEORGIA.—To assume liability for $2,655,000 of equipment trust certificates to finance in part 500 50-ton box cars to be built by the Pullman-Standard Manufacturing Company at an estimated cost of $3,325,660. Division 4 approved sale of the certificates for 99.27% based on an interest rate of 2⅞%—the bid of Halsey, Stuart & Co. and one associate—which will make the annual cost of the proceeds to the road 3.01%. The certificates, dated August 1, will mature in 15 equal annual installments of $177,000 each, beginning August 1, 1955. They were reoffered to the public at prices yielding from 1.5 to 3.05%, according to maturity.

LAKEFRONT DOCK & RAILROAD TERMINAL.—To issue $3,650,000 of Series B first mortgage bonds to partially reimburse the Baltimore & Ohio and the New York Central for advances made to the terminal company for capital purposes (*Railway Age*, August 9, page 15). Division 4 approved sale of the bonds, guaranteed by the Central and the B&O, at 99.46% based on an interest rate of 3¾%—the bid of Halsey, Stuart & Co. and two associates—which will make the annual cost of the proceeds to the road 3.79%. The bonds were reoffered at 100.70.

ILLINOIS CENTRAL.—To issue $25,000,000 first mortgage 26-year, 3¼% bonds to be used to redeem entire $25,000,000 issue of consolidated mortgage, 30-year 4¼% bonds (*Railway Age*, July 19, page 12). Division 4 approved sale of the bonds for 98.84% at 3¼% interest rate—the bid of Halsey, Stuart & Co. and 36 associates—which will make the annual cost of the proceeds to the road approximately 3.32%. The bonds, to be dated August 1, 1954, would mature August 1, 1980. The bonds were resold to the public at 99⅝.

Applications

APACHE.—To issue 3,000 shares of $100 par preferred stock and $600,000 of 4% first mortgage serial refunding bonds, in exchange for $900,000 of 5% income bonds. The new bond issue would be dated July 1, 1954, and would be retired in 20 equal annual installments of $30,000 each, starting June 30, 1955. It is intended to reduce the road's bonded indebtedness and its annual interest payments.

WESTERN MARYLAND.—To issue $16,000,000 first mortgage bonds, proceeds from which would be used to redeem $12,632,000 of a 1951 issue and to repay the road's treasury for $3,368,000 spent for capital improvements and expenditures. Dated October 1 and scheduled to mature October 1, 1979, the bonds would be sold by competitive bidding, the interest rate to be determined by such bidding.

Dividends Declared

ERIE & PITTSBURGH.—87½¢, quarterly, pay. September 10 to holders of record August 31.

SOUTHERN PACIFIC.—75¢, quarterly, payable September 20 to holders of record August 30.

Security Price Averages

	Aug. 24	Prev. Week	Last Year
Average price of 20 representative railway stocks	70.83	71.86	61.32
Average price of 20 representative railway bonds	96.79	97.02	90.16

Supply Trade

Pittsburgh Plate Glass Company has announced plans to construct a large, modern plate glass producing plant at Cumberland, Md., at an estimated cost of about $34 million.

Jack E. Heuser, engine division sales manager of **LeRoi Company,**

RAY DERVEY, district sales manager of the American Hoist & Derrick Co. at Pittsburgh, who has been promoted to general sales manager at St. Paul. He succeeds John E. Carroll, who has been named president of the company.

has been appointed vice-president in charge of sales.

OBITUARY

Max Epstein, Founder of General American, Dies

Max Epstein, founder of the General American Transportation Corporation and chairman of its executive committee, died at his home in Winnetka, Ill., August 22.

A native of Cincinnati, Mr. Epstein founded the General American organization at the age of 23. The name of the company was changed to General American Tank Car Company in 1916 and subsequently to General American Transportation Company.

Today, General American is a corporation operating 11 separate divisions plus four affiliated organizations, including one in Canada and two in Mexico. The most-recently acquired division (*Railway Age*, August 23, page 11) is the Fuller Company of Catasauqua, Pa., manufacturers of pneumatic conveying systems for dry bulk materials such as are used in the "air slide" car. Its car operating division owns and operates a fleet of about 63,300 freight cars, while its car building division designs and manufactures freight cars of all types at East Chicago, Ind., and Sharon, Pa.

Winthrop K. Howe, 86, who retired in 1945 as vice-president in charge of engineering, General Railway Signal Company, died at his home, August 20.

Railway Officers

LONG ISLAND. — **James A. Schultz** has been appointed to the newly created position of director of public relations at Jamaica, N.Y. Mr. Schultz had been with the public relations department of the Pennsylvania at Philadelphia for the past 10 months. **Paul A. Blauvelt,** LI publicity director, will continue as assistant director of public relations and editor of the monthly employee magazine, The Long Island Railroader.

Thomas M. Goodfellow, recently named general manager (*Railway Age*, June 28) has been elected vice-president and general manager.

NEW HAVEN. — **Frederick J. Orner** has been appointed general manager at New Haven, Conn. Mr. Orner entered New Haven service in November 1935 as clerk in the statistical and research department, later becoming merchandise supervisor, chief of merchandise bureau and superintendent freight transportation. From February 1951 to June 1953 he was in Washington, D.C., as acting director of the Railway Transport & Port Utilization Division of the Defense Transportation Administration. Upon returning to the New Haven a year ago he

Frederick J. Orner

became manager of freight car utilization, which position he held until his promotion to general manager.

Craig D. Kelly, assistant superintendent at New Haven, and **David G. MacLeod,** trainmaster at Providence, have been appointed to the newly created posts of terminal superintendents at Hartford, Conn., and Providence, R.I., respectively. **Walter K. King,** superintendent car service at New Haven, has been promoted to assistant general superintendent transportation, and has been succeeded by **James M. Finch, Jr.,** assistant trainmaster at Harlem River, New York. **Cornelius F. Shanley,** station service assistant at New Haven, has been named manager station service. **Keith P. Young,** assistant trainmaster at Bridgeport, replaces Mr. MacLeod as trainmaster at Providence.

Robert L. Barbour, director of public relations of the Jersey Central Lines since August 1952, has been

Robert L. Barbour

named director of public relations of the New Haven at Grand Central Terminal, New York.

A. B. Chapman has been appointed passenger service supervisor at Boston, and will be responsible for system supervision of passenger station services, with particular emphasis on ticket office operations and information and reservation methods and procedures.

The freight traffic department has announced removal of its New York offices to Room 5623, Grand Central Terminal building.

SAVANNAH & ATLANTA. — **C. W. Bowers** has been appointed chief engineer at Savannah, succeeding **E. A. Bleakley,** who has retired from active service because of ill health. The position of assistant chief engineer has been abolished. **Roy I. Kirchner,** engineer maintenance of way, has retired from active service at his own request.

OBITUARY

E. D. Burnett, general agent, passenger department, **Nickel Plate,** died in St. Louis August 14.

C. G. Lunday, vice-president of the **Louisiana & Arkansas,** died recently at Shreveport, La.

William F. Vail, 59, traffic manager of the **New York, Ontario & Western,** at New York, died August 23 at his home in Bound Brook, N.J.

Fitted Bearings Reduce Hot Boxes

Preliminary showing exceptionally favorable in service tests on MDT refrigerator cars

ONE OF THE THOUSAND refrigerator cars in the AAR-MDT fitted-bearing test.

The fitted journal bearing test, now being conducted by the AAR Mechanical Research Department in conjunction with the Merchants Despatch Transportation Corporation (*Railway Age*, July 19, page 28), is currently showing only about one case of overheating to 27 with AAR standard unfitted bearings. This test is running on 1,000 refrigerator cars which accumulated 16½ million car-miles through July 31. Assuming continued favorable performance during the remainder of the difficult hot summer months, changes in present bearing standards will no doubt be recommended.

The practices and wear limits under which AAR freight journal bearings are now maintained allow bearing diameters almost ½ in. larger than the journal diameters. Initially this will provide only a line-bearing contact. Laboratory tests have shown that bearings with small contact area are more subject to oil film breakdown than when full contact area prevails. In early stages of operating oversize bearings there is actually some deformation of the lining metal until it produces sufficient contact area with the journal to operate normally, but frequently bearings fail while undergoing this process. To show the relation of these unfavorable conditions to hot boxes is the objective of the present test.

The test is being conducted with 1,000 new 40-ton refrigerator cars, 700 MDT Nos 12000 to 12699 and 300 NRC Nos. 16500 to 16799. The cars are equipped with nominal 5-in. by 9-in. axles having three different journal diameters to represent journals when new and at two reduced diameter stages. Journal bearings of predetermined bore diameters were applied to establish a comparison between those having a bore to correspond with the diameter of the journal and those having a bore diameter of a new bearing of conventional design regardless of the reduced diameter of the journal on which it might be used. The several combinations of axle journals and journal bearings applied to them are shown in Table 1.

To make sure that test results represent the comparative performance of fitted versus unfitted journal bearings—minimizing the influence of extraneous factors and considerations—no special devices and with one exception no special materials were used in the journal boxes to supplement the functions of the standard oil-saturated waste packing and the other standard parts of the journal box assembly. The one exception is that Satco bearing metal was included in the test to determine if it would give any better performance than standard bearing metal when tested under comparable axle and bearing conditions.

It was important, however, that the axles and bearings be positively identified as to their respective sizes to assure proper fitting. For that reason, special symbols or markings were applied on the end of each journal and test bearing.

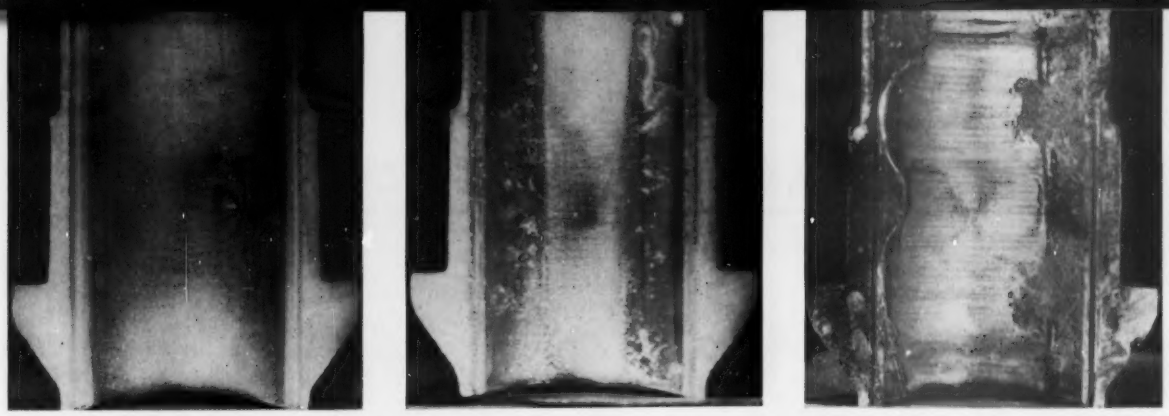
The first of the 1,000 test cars was released from the builder's plant and placed in interchange service October 13, 1953, and the last on February 25, 1954. No unusual attention has been given to the cars and, except for special reports to the Mechanical Research Department covering bearings removed, they are handled the same as any other interchange cars.

Spot checks and examinations of fitted and unfitted bearings, have been made from time to time, and the conditions commonly found disclose a distinctive pattern for each type, as shown in the illustrations.

The bearing areas illustrated are representative of bearings of their respective types examined to date. In order to complete the record ten cars having both fitted and unfitted bearings were examined after approximately 600 miles of service and the projected areas of contact were measured by planimeter and the areas for each

TABLE 1—STANDARD AND FITTED-BEARING BORES AND JOURNAL SIZES IN TESTS

		Journal Bearings	
Number of cars	*Journal Diameter*	*Bore Diameter*	*Lining Metal*
200	5 in.	5 1/16 in. (standard)	Standard
200	5 in.	5 1/16 in. (standard)	Satco
50	5 in.	5 in.	Standard
50	5 in.	5 in.	Satco
100	4.8 in.	5 1/16 in. (standard)	Standard
100	4.8 in.	4.8 in.	Standard
100	4.7 in.	5 1/16 in. (standard)	Standard
100	4.7 in.	4.7 in.	Standard
50	4.7 in.	5 1/16 in. (standard)	Satco
50	4.7 in.	4.7 in.	Satco



Fitted bearing (left) after 15,384 miles service; originally bored 4.7 in. in diameter and applied to a journal having the same diameter. The journal contact surface of the bearing covers 27.25 sq. in. or practically the full inside projected area of the lining. The bearing surface is free of abrasions and has a dull gray satin-like finish indicating adequate lubrication.

Unfitted standard bearing (center) after 15,784 miles service; originally bore 5 1/16 in. and applied to a journal having a diameter of 4.7 in. The bearing surface covers only 13.98 sq. in. and has a brighter gray color with slight abrasion as if starved for oil. There is considerable evidence of waste-particle deposits in the apertures between the bearing lining and the journal surfaces at each side of the area of contact.

Unfitted standard bearing (right) originally bored 5 1/16 in., which failed after application to a journal with 4.7-in. diameter. The bearing obviously contacted the journal only partially and when sufficient waste accumulated in the apertures the flow of oil was retarded and the bearing failed because of excessive temperature generated by the high unit bearing pressure and lack of oil.

type and for each size of journal were calculated and averaged. These averages together with the resulting unit bearing pressures in pounds per square inch that would obtain when the axles are loaded to the AAR rated capacity are shown in Table 2.

This table indicates that in the early stages of service of unfitted bearings the unit bearing pressures are abnormally high. At the same time the non-contacting bearing surfaces are relatively large, thus affording a more or less unrestricted opportunity for particles of packing and foreign matter in considerable quantities to be deposited in the apertures between the bearing and journal. These factors have a vital influence in producing the unfavorable performance experienced on cars soon after they receive periodic lubrication attention under Interchange Rule 66 where bearings are renewed.

To and including July 31, 1954, the 1,000 cars in the test accumulated a total of 16,438,807 miles and in the same period a total of 62 bearings was removed for various causes. Of this total, 28 had damaged or destroyed bearing linings due to overheating. One of those removed on account of overheating was a bearing fitted to conform with the diameter of the journal, whereas the other 27 bearings had been applied unfitted in accordance with existing standard practice. The comparative mileage performance as between fitted and unfitted bearings through July 31, 1954, is shown in Table 3.

On the bearing unit basis, the heating failures experienced with unfitted bearings compared with such failures with fitted bearings were in the ratio of 14½ to 1. Some of the cars had two or more bearings removed at the same time on account of overheating and when making comparisons on a bearing unit basis as above they should be included. However, when making comparisons on the basis of cars set out or delayed, only the first or the bearing actually responsible should be counted.

When so computed, the result would be comparable with similar car delay statistics for the member roads prepared by the AAR and show an advantage of 7 to 1 in favor of the fitted bearings.

When appraising the apparent superiority of the fitted over the standard unfitted bearings it should be considered that the test through July 31 has not covered a complete year's cycle and included only two of the three hot summer months in which lubrication failures are very prevalent. The fact that no appreciable increase in heating failures of fitted bearings occurred during June and July, however, is quite significant.

Test data through July 31 seem to prove conclusively that in the early stages, at least, the fitting of bearings is effective in reducing the frequency of heating failures. This is in accordance with the principles of bearing theory and design and also with the laboratory tests conducted by the AAR Research Department.

TABLE 2—BEARING AREAS AND UNIT PRESSURES AFTER 600 MILES OF SERVICE

Journal diameter, in,	*Bore of bearing, in.*	*Average projected contact area, sq in.*	*Average bearing pressure psi*
5.0	5 1/16	12.43	1,295
5.0	5.0*	30.21	533
4.8	5 1/16	7.46	2,157
4.8	4.8*	20.46	787
4.7	5 1/16	7.15	2,251
4.7	4.7*	28.79	559

*Fitted bearing

TABLE 3—COMPARATIVE MILEAGE PER HOT BOX WITH FITTED AND UNFITTED BEARINGS

	Fitted bearings	*Unfitted bearings*
Number of cars	350	650
Total car-miles*	6,132,988	10,305,819
Bearings damaged and removed due to overheating	1	27
Car-miles per bearing removed due to overheating	6,132,988	381,697
Bearing removals due to overheating which caused car delays	1	13
Car-miles per heating failure which resulted in car delays	6,132,988	792,755

*Up to and including July 31, 1954

Studebaker Labor And Railway Labor

The head of one of the great railway labor organizations observed recently, in private conversation, that the railway unions and railway management ought to be exploring—more than they have yet done—the questions wherein their interests are identical, rather than in conflict. He certainly was, and is, right.

The observation of this railway labor executive comes to mind in noting the action of the unionized employees of the Studebaker Corporation, who recently accepted a substantial reduction in wages—in order to improve the competitive position of their employer in the sale of automobiles. The position of the railroads and their employees as regards competition is similar—in some respects, but not wholly—to that of Studebaker and its employees.

The railroads are suffering from loss of traffic because of competitive rates made higher than they otherwise would have to be, because of high labor costs. Nothing noteworthy and on a large scale has been done by organized railway labor to reduce the railways' labor costs—hence strengthening the railways competitively—which in any way parallels the statesmanlike action of the Studebaker unionists. Why? Are organized railroad employees less farsighted and less intelligent than those of the automotive industry? We doubt it.

The issue at Studebaker was pretty clear. A wage reduction would be reflected almost immediately in a more favorable competitive selling price of the company's product. That is a conclusion which was comparatively easy for employees to understand in Studebaker's case. Moreover, with a manufacturing business, the alternative to favorable competitive selling prices might well be a complete shut-down—destroying the jobs, not merely of some or many employees, but of all of them.

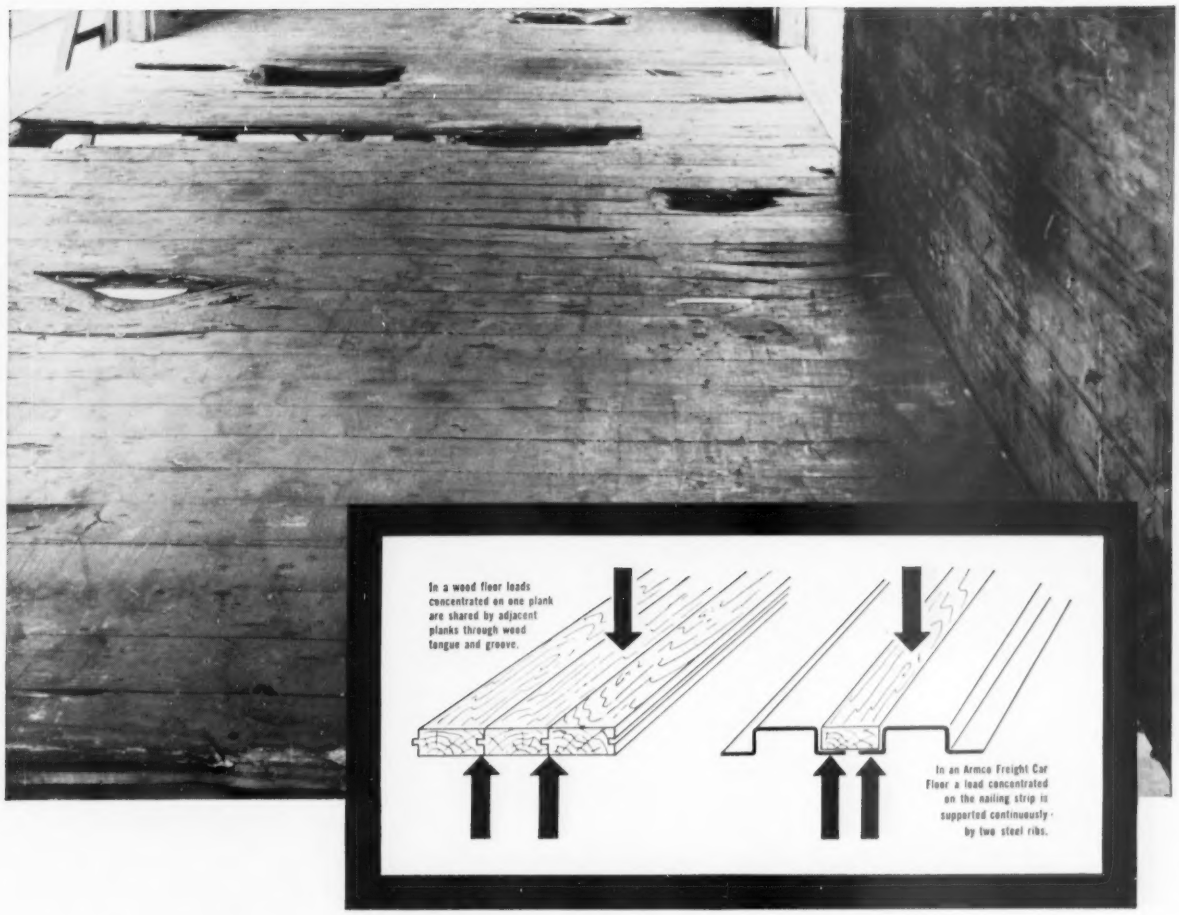
With the railroads the situation is considerably different. Not all railroad rates come into competitive conflict with the charges of other agencies of transportation. So, if railroad rates—because of high labor costs—are higher, on the average, than they ought to be, it is only a part (probably an important part) of the railroads' business that is adversely affected. Even if railroad labor costs were considerably higher than they now are, at least *some* traffic of many railroads would still remain on the railroads. This means that the jobs of "old head" employees on most railroads can seldom be shown to be acutely endangered by comparatively high labor costs. This fact automatically removes a substantial percentage of railroad employees from an immediate, serious and easily understandable self-interest in moderating their wage demands.

To find a closer parallel with the Studebaker situation in the railroad industry, we have to go to some of the smaller railroads in acute distress, with barely enough resources to continue operation. In such cases, railroad employees have often accepted "substandard" wages and working conditions. But it surely is not going to be any solution to the railroads' competitive problem to have to wait until the industry approaches the ragged edge of large-scale abandonment, in order to get the kind of employee understanding of costs and competition that Studebaker employees appear to have acquired so surely and so quickly.

The Studebaker employees reached a realistic decision because *there was an easily understandable and strong incentive for every employee on the payroll to make some sacrifice to enable the company to reduce its selling prices.* Quite likely, the employees of the railroads or any other business would have acted exactly as the Studebaker employees acted—if similarly clear and strong incentives were provided in railroad pricing practices to induce them to act that way. The relation between labor costs and product pricing on the railroads is much more complex and obscure.

If a competent professional in economics were put to the task of examining railroad practices—with the goal of establishing incentives to economic behavior wherever they are desirable, and are now either absent or are operating in reverse—the result ought to be at least as rewarding as opening up an oil field on the company's property. And what would come out of such an inquiry should be as lucrative to railroad labor as to railroad investors and patrons.

What the railroads need most, undoubtedly, is greater freedom to compete for business. As one necessary step toward that end—aside from moderation of regulation—they need to reorient their internal practices more effectively to the objective of competition. If that should happen on the railroads, then the kind of unionist foresight shown by Studebaker employees could occur as easily in railroading as in the manufacture and sale of automobiles.



Armco Car Flooring won't let this happen!

In Armco Freight Car Flooring, stout hat-section steel ribs take the load and support heavy wood nailing strips. That's why, even without extra stringer support, Armco Freight Car Flooring resists the heavy concentrated loads of lift trucks that often break through conventional car flooring. Besides, the ribs are welded to the car underframe and reinforce it.

For Gondola and Flat Cars, too

Armco Freight Car Flooring is made for gondola, box and flat cars. It is designed both for new construction and for replacement of worn-out wood or steel-plate floors in existing cars.

A Multi-Purpose Floor

The Armco floor will handle bulk- or unit-lading equally well. This eliminates the problem of selecting a car by floor type. It saves time and money for both the railroad and the shipper in switching empty cars. This is of special importance in the case of gondola cars. The same car that brings bulk loads into a plant can carry away the manufactured product.

Armco Freight Car Flooring is made for fastening bracing and skids in the proper way—with nails. There's no invitation to weld fasteners to plate floors or burn holes for bolts.

Send for Booklet

There's a new booklet about "Armco Freight Car Flooring." We'll send you a copy if you'll fill out the coupon below and mail it to us.

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Send me a copy of the booklet, "Armco Freight Car Flooring."

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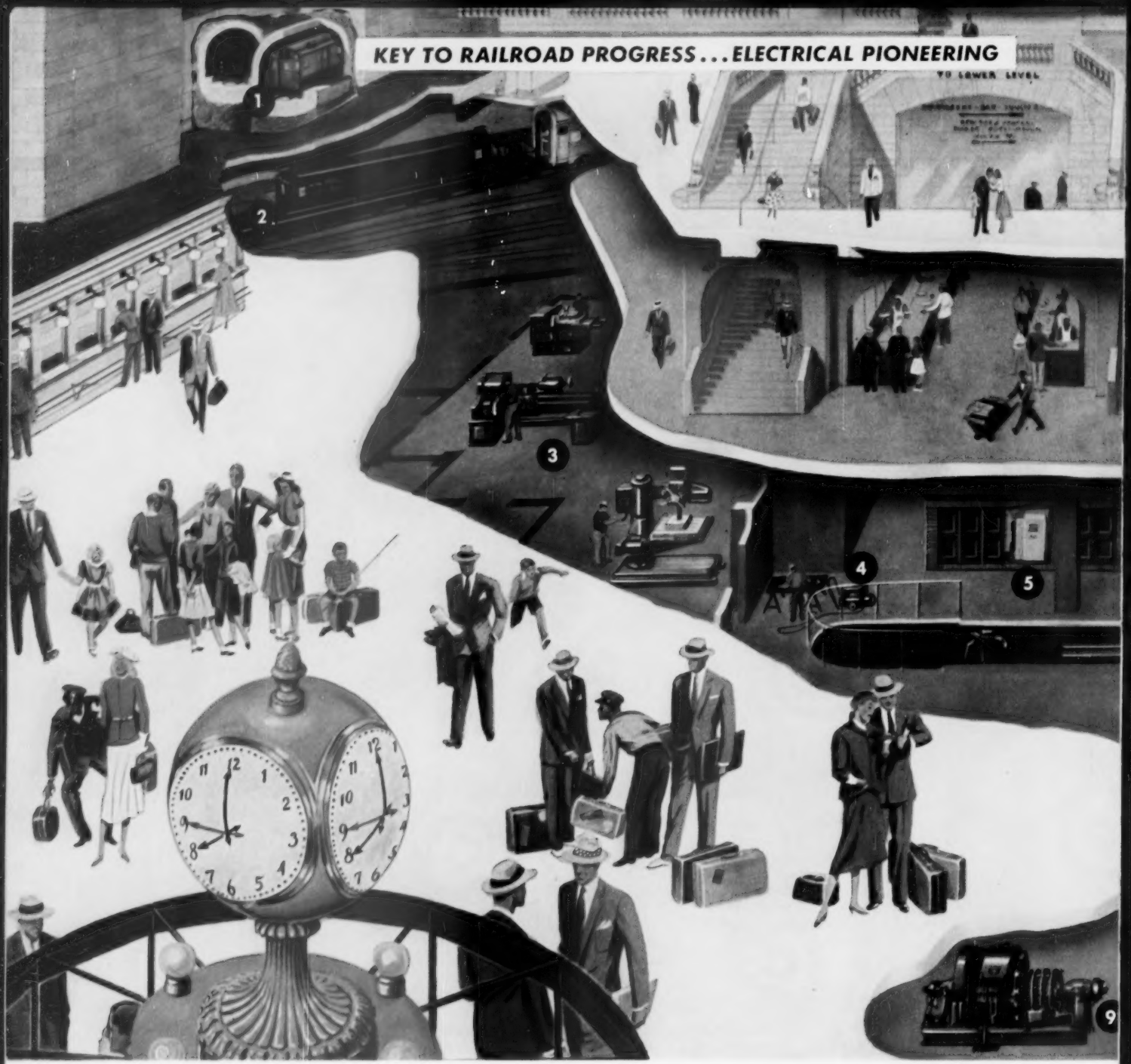


THESE ELECTRICAL SERVANTS KEEP RAILS HUMMING IN GRAND CENTRAL TERMINAL

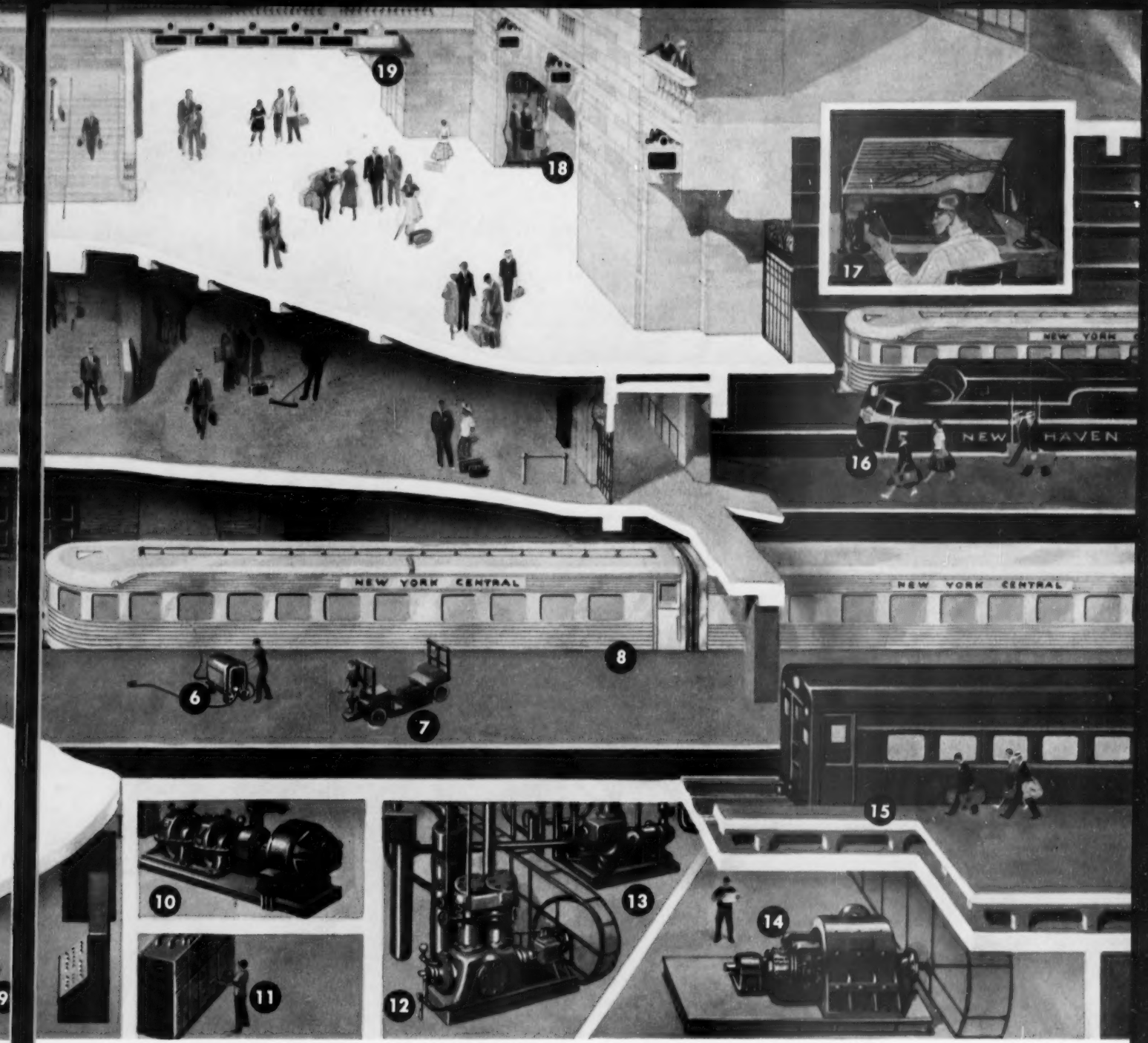
1. Subway car equipment. 2. Traction power (3rd rail). 3. Terminal maintenance shop facilities. 4. Welder. 5. Transformers for light and power. 6. Battery charger. 7. Electric battery trucks. 8. Passenger car electrical equipment (heating, air conditioning, lighting). 9. Converters to change current from AC to DC. 10. Fire pumps and house pumps. 11. Distribution panel for light and power. 12. Motor-driven refrigeration machine for concessions. 13. Heating equipment. 14. Motor-driven ventilation equipment. 15. Multiple unit car. 16. Electric locomotive. 17. Signal and control tower equipment. 18. Elevator controls and motors. 19. Lighting.

HOW ELECTRICITY SPEEDS

G-E equipment helps railroads in continuing program to improve vital electric services in vast "underground cities"

Every year, more than 54,000,000 passengers pass in and out of New York City's Grand Central Terminal.

Thanks to electricity, the job is done smoothly, swiftly. Locomotives, switches, signals, station lighting—all depend on electric equipment. In one year, enough electricity is used to meet all the needs of a city of 386,000 people . . . over 193,000,000 kilowatt hours!



Artist's Cutaway of New York's Grand Central Terminal shows some of the electrical equipment which helps make possible smooth operation of this underground city.

196,000 RIDERS A DAY THROUGH GRAND CENTRAL

As far back as 1906 General Electric supplied much of the electrical equipment and many of the locomotives that operate out of Grand Central Terminal, and modern electric equipment for subway and commuter cars. Today, G.E. is still helping to find new ways to move rail traffic easier, faster.

The nation's railroads are doing a tremendous job in helping America travel. Working closely with them, General Electric engineering and research will help further this railroad progress in the years to come. General Electric Company, Schenectady 5, New York. 115-2

Progress Is Our Most Important Product

GENERAL ELECTRIC

THIS IS THE SECOND in a series of messages appearing in news and railroad magazines to give the public a better understanding of the vital role played by the nation's railroads in our everyday lives.

Questions and Answers FOR THE TRANSPORTATION DEPARTMENT

As railroads become fully dieselized, or approach that goal, the utilization of diesel power is receiving increasing attention. In this column, August 2, the chief operating officers of two roads described some of the methods used on their properties to try to assure best utilization of motive power. This week, the operating vice-president of another railroad tells of his company's efforts to use its power to best advantage —*G.C.R.*

CONDUCTED BY G. C. RANDALL, district manager, Car Service Division (ret.), Association of American Railroads, this column runs in alternate weekly issues of this paper, and is devoted to authoritative answers to questions on transportation department matters. Questions on subjects concerning other departments will not be considered, unless they have a direct bearing on transportation functions. Readers are invited to submit questions, and, when so inclined, letters agreeing or disagreeing with our answers. Communications should be addressed to Question and Answer Editor, *Railway Age*, 30 Church Street, New York 7.

How the Baltimore & Ohio handles diesels.

My comments will be restricted to the eight points mentioned in your column of August 2.

(1) Authority for assignment of all diesel locomotives is centralized in my office. On the B&O:

(a) Road passenger diesels have system-wide assignments;
(b) Passenger road-switchers have regional assignments;
(c) Road freight units may be assigned to more than one region, but each region is limited to its quota in number of units at a given time; and
(d) Switchers are assigned to specific locations on division.

Daily distributions of designated units are handled by:

(a) A central location for all road passenger diesels;
(b) Regional offices for passenger-road switchers; and
(c) Each region for the quota of diesel freight units assigned to it.

(2) Running repair shops are in locations readily accessible to diesel units, on normal assignments, which require routine repairs, mileage and form work. When scheduled for laid-in work, diesels usually are assigned to runs routed to shop locations.

(3) Train movement charts are used extensively by my transportation engineering staff in assigning newly acquired diesels, and in reassigning others to meet changing conditions.

(4) When a surplus of power exists, doubling up, rather than storing units, is permitted to a limited extent, as a temporary expedient. Surpluses generally, however, are reassigned to given territories where they can displace steam power. Displaced steamers either are stored or replace older steam power.

(5) The B&O was one of the first railroads to make use of a diesel maintenance instruction car of its own. We now have two of them. In addition, maintenance schools have been established at several key locations. Regular courses of instruction are given to motive power employees, shop supervisors, operating crews and road supervisors. We also require that an advanced course be taken by supervisors in the maintenance of equipment and transportation departments who are responsible for the way in which their forces repair, service and operate diesels. We think the job of educating our forces is never done, because instruction is needed by new employees, by regular employees assigned to new duties, and by all concerned when new types of power are employed or older units are altered.

(6) We have not found it necessary to disturb our local freight schedules to accommodate diesel power. Most such service still is handled by steam. In fully dieselized territories, road switchers and switchers handling local freights often are used on yard assignments when their road jobs are completed.

(7) Our streamlined passenger locomotives practically never are used in freight service. They are geared for maximum speeds of 95 and 98 mph. Passenger road-switchers with 95-mph gear ratio normally handle branch-line passenger trains, and are used to a limited extent also in yard and local freight service. Our road freighters are geared for 65 and 70 mph. About 22% of them have train heating equipment and other facilities for handling passenger trains. However, they are only so used in emergencies and on special movements when the supply of passenger power is tight.

(8) Development, publication, distribution and enforcement of tonnage ratings also are under my jurisdiction. This important control is applied uniformly over the system and is not subject exclusively to the narrower interests of either the operating or the maintenance department. Ratings are reviewed continually and revised when necessary in the light of experience and as operating conditions change. —*W. C. Baker, vice-president—operations and maintenance, Baltimore & Ohio.*

Shortly, we hope to be able to bring you the experience of a completely dieselized road which has come up with an interesting solution to one part of the utilization problem in periods when seasonal or other traffic factors prevent maximum use of every unit. —*G.C.R.*

In the column of September 13 we will give the answers to the quiz on the handling of explosives. The number of replies received to date indicates, either that you didn't care for the subject, or that summer pleasures are taking first place in your thoughts. In the latter case, can't say I blame you. —*G.C.R.*

"Distinguished Contribution" in *Railway Age* Essay Contest

"Inherent Advantages"—

- Why Are They Important?
- How Can They Be Attained?

By DUDLEY E. PEGRUM

Professor, Department of Economics
University of California at Los Angeles

I. The National Transportation Policy — The Transportation Act of 1940 amended the Interstate Commerce Act by inserting a preamble to the latter whereby it was declared to be the national transportation policy of the Congress: to provide fair and impartial regulation of all modes of transportation so administered as to preserve the inherent advantages of each; to promote safe, adequate, economical and efficient service and foster sound economic conditions in transportation and among the several carriers; and to encourage the establishment of reasonable charges without unjust discriminations or unfair or destructive competitive practices.

By this legislation, Congress, for the first time, enunciated a national transportation policy for all carriers under the jurisdiction of the Interstate Commerce Commission. Although this declaration probably lacked the force of law, at least in the technical legal sense, it nevertheless expressed the intent of Congress to require the Interstate Commerce Commission to carry out its regulatory duties within the framework of broad objectives.

II. The Objectives of the National Transportation Policy—A reading of the legislation in the light of the studies and debates leading up to it indicates that the underlying idea behind this announced national policy was to extend and administer regulation in a way designed to permit and to promote healthy and fair competition. This was to be achieved by a public policy which would apply fair and impartial regulation to all the agencies of transport under the control of the Interstate Commerce Commission. The purpose of this fair and impartial regulation was to achieve a number of specifically stated objectives.

Probably the primary objective of the new policy, to which the others seem to be subordinate, was to recognize and preserve the inherent advantages of each mode of transport. Although the meaning of this phrase was not spelled out, it appears to be quite obvious that Congress felt that each agency of transport possessed certain technological and economic characteristics that made it more capable of rendering certain types of services than the other agencies. It is apparent, however, that Congress recognized that these capabilities could not be realized, either for the carrier or the public, if the rules laid down by public authority did not permit it. As a consequence, Congress enumerated, in very general terms, what some of these rules were to accomplish.

These objectives and the formal statement of them in Section I of the Interstate Commerce Act constitute a declaration of policy upon which everyone could probably agree. The trouble is that all the terms and phrases are practically devoid of content in the context in which they are used. As they stand they can literally mean all things to all people. On the other hand, it seems reasonable to assume that Congress phrased its declaration in the setting of a private enterprise economy and on the assumption of continued private ownership of the means of transport. If this is so, then the key to the meaning of the declaration lies in the meaning of the term "inherent advantages." This is not obvious from the phrasing of the declaration. The clue to it must be sought in economic analysis, for, to the economist at least, the declaration instructs the administrative agency to provide results that would be obtained under free and fair competition.

III. The Concept of Inherent Advantages in Economics—Economic activity does not occur in a vacuum but, within the framework of a social order. It therefore requires rules of the game. Insofar as a country follows a conscious economic policy, it establishes rules that are designed to promote the most economical use of its resources. These rules will, therefore, be framed so as to encourage or facilitate the utilization of economic resources in accordance with the principles of competition. In a private enterprise economy this means that the rules will be set up so as to preserve competition and to utilize the forces of competition to the fullest extent. It is within the foregoing framework that the concept of inherent advantages has its meaning and within which a definition must be formulated.

Definitions are always broad statements, at best, and they must be understood in the context in which they are given. With this in mind, *we may define inherent advantages as: those advantages, which a producer possesses as a result of greater efficiency of operation, that make it possible for such a producer to attract customers*

This is a somewhat condensed version of an essay submitted in the *Railway Age* contest for the best paper on "Inherent Advantages of Railway Transportation," for which President Warren W. Brown of the Monon provided a prize of $500. Classed by the judges a "distinguished contribution," this is the third of the submissions to appear in *Railway Age*. The prize-winning paper by William J. Rae was published July 5, and a "distinguished contribution" by William K. Tate appeared August 2.

These papers, together with eight others selected by the judges as outstanding, have been published by *Railway Age* in a booklet entitled "Inherent Advantages of Railway Service." Single copies are $1 postpaid. For purchases in quantity prices are: 10 copies, 75c each postpaid; 50 copies, 50c each and 100 copies, 40c each f.o.b. printer.

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to his business at lower relative prices than those that can be offered by the rival or supplier of alternatives.

IV. Competition in the Transport Field—The idea of inherent advantages is implicit in an economical allocation of resources and is therefore implicit in all competitive concepts. So much is this the case, that the term is not even used in the general field of industry. Why then did it emerge in the declaration of the national transport policy and why has there been so much misunderstanding as to its meaning in the context in which it was used? The answer seems to lie in the diverse economic and technological characteristics of the industries that make up the field of transport and in the fact that monopoly and competitive situations are inextricably mixed in a way that is not found anywhere else in our industrial structure.

Railroads possess those economic characteristics that, comparatively early in railroad development, led them to be classified by economists as natural monopolies, a category which is shared with electric light and power, water, natural gas and telephones. The word natural, as it is used in this connection, emerges from the economic structure of the industry in question. There are several reasons for this. Capital has to be invested in amounts which are large relative to the market opportunities available for the services. Capital costs therefore form a relatively large part of the total costs of production and any addition to the plant will involve a large proportionate increase in capital investment and will necessitate a large prospective increase in the market. In addition to this, much of the investment is specialized both as to functions and as to markets. For example, railroad tracks are useful only where they are laid and cannot readily be turned to other areas if the markets shift. Moreover, they have little use except for supplying railroad transportation to a geographically fixed area.

These characteristics, together with the fact that a railroad offers a variety of transport services, gives rise to a complicated set of cost relationships. A large portion of railroad costs are independent, at any particular time, of the volume of traffic. These costs are incurred whether there is any business or not. A much smaller part of the total costs vary directly with changes in the volume of traffic. These cost characteristics give rise to two important effects on the pricing of railroad services. In the first place, because a considerable portion of the costs result in a number of different services, that is they are common or joint costs, they cannot logically be traced or allotted to any particular service. Hence, they must be recovered from whatever traffic can bear them. In the second place, the presence of a large volume of fixed costs means that these will have to be recovered from any traffic that will bear them also. It will be better to take traffic at any rate that will more than cover variable costs rather than to refuse it, because by taking such traffic some contribution is made to the fixed costs. This not only may serve to lower the total burden on other traffic but it also makes for a more economical use of resources. Thus, such a procedure is both socially and privately beneficial.

In summary, railroad cost characteristics are such that a large part of the costs cannot be traced to specific items of traffic. The range between average costs, which really have little meaning in this connection, and the minimum costs above which traffic should be taken rather than refused, is quite wide. Railroad rates do not bear as close a relationship to costs as do prices in a highly competitive field. *Demand, therefore, instead of fully allocated costs, should be the basis for railroad rate-making.*

The economic features which characterize railroad transportation are almost completely lacking in motor transport. The technical units are relatively small and may be very small. Operations may be started with a very small investment and expansion may be undertaken with very small increments of investment in direct and almost immediate response to the growth in traffic Most of the facilities are not highly specialized or unalterably committed to a particular market or geographic area and they can readily be shifted to any other market. Physically the highways or routes are available to all who wish to use them. Economic limitations on the additions to facilities are slight because small increases in traffic increase the need for additional equipment, at least within very narrow limits, and these additions may be made in small units. Existing facilities can be completely utilized, except within a small range, and additional traffic can be accommodated only by acquiring additional motive power. This will not result in an appreciable lowering of the average total unit costs of output, since the additional output comes as the result of the incurrence of additional costs that are largely proportionate to output. The motor vehicle like the tramp steamer can compete for traffic under conditions of almost classical simplicity.

The characteristics of costs in motor transport are in sharp contrast to those of the railroad. The amount of capital investment relative to the income of the carriers is small. Fixed costs therefore constitute a small portion of total costs. It is the variable costs that loom large. The Interstate Commerce Commission has estimated that, on the average, over 90 per cent of motor trucking costs vary directly and proportionately with the traffic.

The contrast in the variability of costs between rail and motor carriers is explained primarily by the fact that fixed costs are present in railroad maintenance of way and in the capital costs resulting from the investment in road property and terminals. The coresponding roadway costs for motor carriers are distributed on a "use" basis through gas taxes and license fees, and, insofar as the motor carriers are concerned, they become proportional to the traffic carried.

For the most part, motor transport costs can be traced directly to the specific items of traffic. The range, therefore, between average costs and the minimum cost above which traffic should be taken rather than refused is quite narrow. Motor transport rates do and should bear the close relationship to costs that characterize highly competitive business. *Fully allocated or average costs are a decisive factor, therefore, in motor transport rate-making.*

The foregoing analysis of the economic characteristics of motor transport apply with almost equal force to water transportation. The costs of the latter are highly variable with traffic. One significant difference arises in connection with inland water transport—namely, that the waterways are toll-free. This lowers the total costs which the water carrier has to cover, but it probably does not

have any bearing on the relation of water rates and costs, since, if tolls were charged, they would vary with use—just as highway charges do.

It may now be asked what meaning can be given to the idea of inherent advantages in this complex setting of the field of transport. It is obvious that motor transport offers services which it alone can supply and public advantages which would clearly be lost if it were eliminated.

Similarly, railroads offer advantages of low-cost, mass, long-distance transport. Over a considerable range both agencies can supply very similar, or at least conveniently substitutable, services.

The basic question, however, is: How can the line be drawn between the traffic which one agency should handle and that which should go to the other? In other words, how can the inherent advantages be readily ascertained and utilized?

The answer to this question is: By resort to the standards for economical action established by competitive economic theory. Public policy should be developed so as to permit the various agencies to compete for traffic on the basis of the cost-price relationships that have been set forth above. This is what is done in competitive business.

It is the only rational way to discover the inherent advantages of an agency and to make use of them. The allocation of traffic by the standards of free and fair competition means that the most efficient agency will move it, because such an agency can offer its services profitably at lower cost. This is not likely to be accomplished without resort to the test of competition. Resort to this test is possible only by a price-making process adapted to changing market situations.

V. Standards for Public Policy—If public policy in transportation is to be guided by the standards of free and fair competition, then each of the agencies must be allowed to compete for the traffic which may be moved by any of them, by charging prices for the services which will result in the carrier being better off than it would be if it did not get the traffic. That is, *so long as the carrier can move the traffic at rates which more than cover the costs directly attributable to that traffic, thereby bettering the carrier's net revenue position in comparison with what it would be if the traffic were not obtained, the carrier should be permitted to seek the business.*

To prevent it from doing so results in unused capacity, a misuse of economic resources, and an allocation of traffic contrary to the relative efficiency as evidenced by cost considerations.

Rate-making by this criterion would have to permit a much wider range of differential pricing by railroads than by motor and water carriers because of differences in cost characteristics that have already been pointed out. Public policy, in terms of the most economic utilization of resources and the allocation of traffic according to relative efficencies, is interested in preventing carriers from charging rates which do not add to total net revenue.

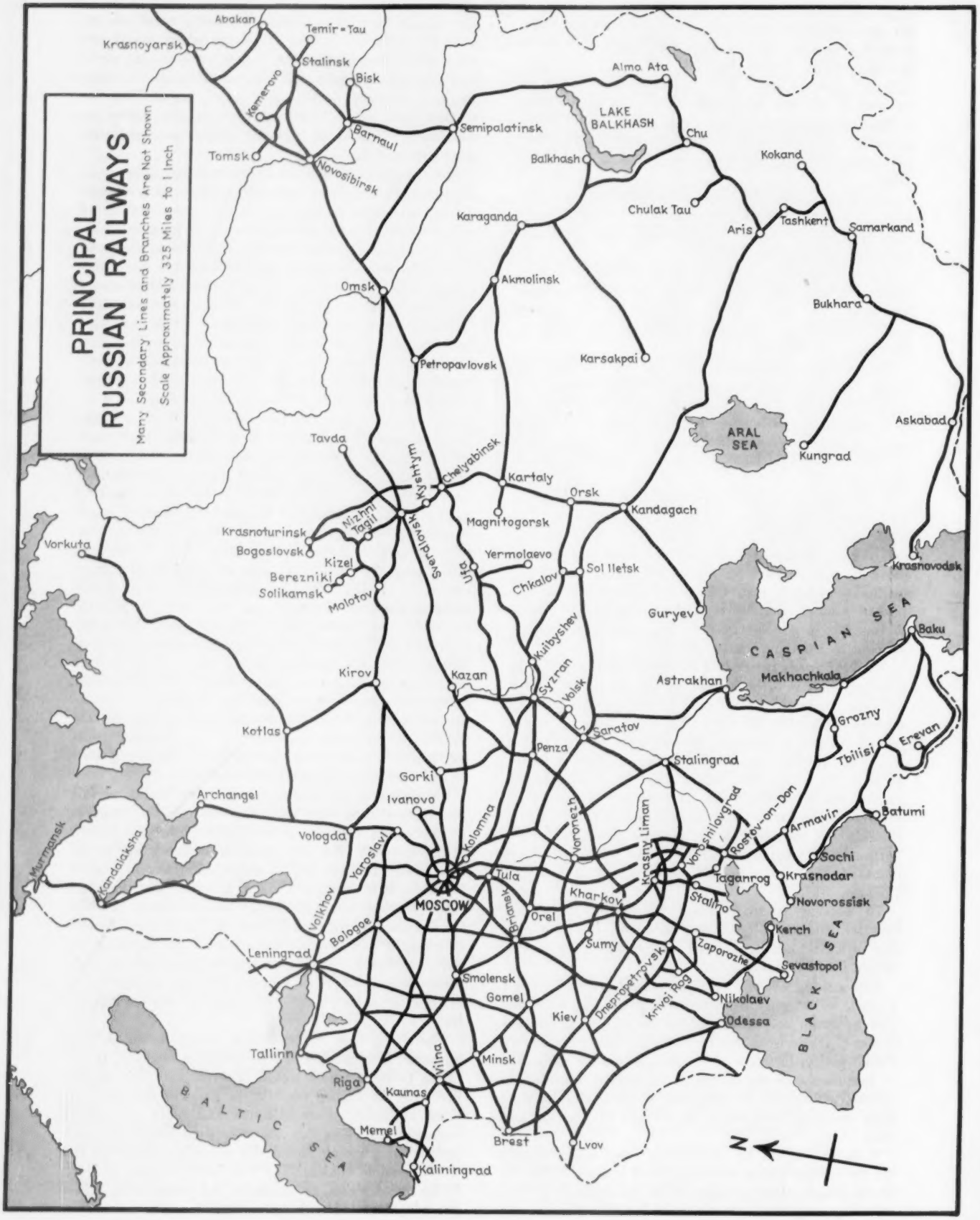
It is not served by prohibiting rates which benefit the carrier but which are not allowed because of the desire to protect other agencies. *When the railroads are not receiving adequate net revenues, it is difficult to see why they should be prevented from obtaining more net income by utilizing a system of pricing which would improve their financial position.* If they are receiving more than adequate revenues, the adjustment should be made on those elements of the traffic which are making the greatest contribution to the net revenue, rather than on the traffic which would be lost to other agencies if the rates were raised.

The average cost approach to rate-making, which is so popular with regulatory authorities today, is a clumsy device which has induced a rigidity in the pattern of railroad rate structures that not only reduces competitive ability but also runs contrary to the idea of allocating traffic according to relative efficiencies. As a procedure of pricing, it is a contradiction of market-oriented prices which a competitive situation demands. The ascertainment of minimum costs below which particular railroad rates should not be allowed to go is not a matter of easy determination but the benefit of doubt, where it exists, should be accorded the carrier. Management cannot be expected to discharge its functions in a responsible way if it is not the repository of the primary decision-making power. This is truer today than heretofore because of the highly competitive situation that has developed among the various transport agencies.

Adoption of a market-oriented policy of rate-making must assume a public policy designed to impose, as much as possible, the full burden of costs upon the various types of carriers responsible for them. This is achieved in the case of railroads through the medium of private ownership of all the facilities. The problem is more difficult in the case of motor and water carriers because the public supplies the heavy investment embodied in the highways and waterways. To equalize competitive conditions, these other carriers should be required to bear equivalent costs. Among other things this means that *motor and water carriers should be required to contribute not only a return on the investment made by the public, but also an equivalent to the property taxes which would have to be paid by these carriers if they owned their own highways or waterways.*

Protection of an industry against the impact of fair competition from other industries—that is, the suppliers of alternative services—is not necessary for the benefit of the economy. The interests of an economy are served best when resources are allocated according to market demands. It is frequently urged, however, that these are inadequate to insure sufficient transportation facilities for purposes of national defense. If this is a valid point of view, it can scarcely be achieved by imposing restrictions which prevent the agencies from reaching their economical limits. Such a policy prevents transportation facilities from supplying even peacetime needs adequately.

Therefore, they are even less adequate for defense purposes. If expansion of transportation facilities, in addition to those which would be evoked by fair market processes, is deemed essential to national defense, then there are other more effective and more economical means of achieving this objective than restricting competition or granting inequitable subsidies. These are the worst possible choices. The best initial choice, at least, is the one designed to recognize and preserve the inherent advantages of each agency.


PRINCIPAL
RUSSIAN RAILWAYS
Many Secondary Lines and Branches Are Not Shown
Scale Approximately 325 Miles to 1 Inch
Abakan
Temir-Tau
Krasnoyarsk
Stalinsk
Bisk
Kemerovo
Barnaul
Tomsk
Novosibirsk
Semipalatinsk
Alma Ata
LAKE BALKHASH
Chu
Balkhash
Kokand
Karaganda
Chulak Tau
Aris
Tashkent
Samarkand
Omsk
Akmolinsk
Bukhara
Petropavlovsk
Karsakpai
Askabad
ARAL SEA
Kungrad
Tavda
Chelyabinsk
Kartaly
Orsk
Kandagach
Nizhni Tagil
Sverdlovsk
Magnitogorsk
Krasnoturinsk
Bogoslovsk
Vorkuta
Kizel
Berezniki
Solikamsk
Molotov
Ufa
Yermolaevo
Chkalov
Sol Iletsk
Krasnovodsk
Guryev
CASPIAN SEA
Baku
Kuibyshev
Kirov
Kazan
Syzran
Volsk
Astrakhan
Makhachkala
Kotlas
Saratov
Grozny
Penza
Tbilisi
Erevan
Stalingrad
Gorki
Archangel
Ivanovo
Batumi
Armavir
Rostov-on-Don
Voroshilovgrad
Krasny Liman
Voronezh
Kolomna
Vologda
Murmansk
Kandalaksha
Yaroslavl
Sochi
Krasnodar
Taganrog
Tula
Kharkov
Novorossisk
MOSCOW
Volkhov
Kursk
Orel
Stalino
Kerch
Bologoe
Sumy
Zaporozhe
Leningrad
Sevastopol
Smolensk
Dnepropetrovsk
Krivoi Rog
Gomel
Nikolaev
Kiev
Odessa
BLACK SEA
Tallinn
Minsk
Vilna
Riga
Kaunas
BALTIC SEA
Memel
Brest
Lvov
Kaliningrad
N

What Do Russian Railways Haul?

THE SOVIET UNION has nearly three times the area of the U.S. and a fourth more population, but only about 66,000 miles of railroad. The principal lines —except that part of the Trans-Siberian between Krasnoyarsk and Vladivostok, on the Pacific—appear on the map on the facing page. Especially in the region south and west of Moscow there are numerous other less important lines, many of which actually were built more for military than for commercial reasons.

Obviously such a railroad system cannot sustain the Soviet national economy and standard of living at anything like the level attained in this country. Moreover, while inland waterways, particularly the Volga river, are an important factor in the Russian transport system, highways are much less significant than in the U.S., especially in intercity freight movement.

As a result, Russian railroad traffic is to a much greater degree than in the U.S. a raw material and heavy product traffic. Capacity is lacking to handle what the Russians consider luxuries—perishables under refrigeration, for example—and "cross-hauling" of competitive products is practically unheard of, because theirs is not a free enterprise economy.

Moscow, the capital and largest city, is the principal Soviet railroad center. It is also the principal manufacturing and commercial center. Ten major lines radiate from ten separate stations and handle a considerable passenger traffic and a large volume of freight, predominantly raw materials and fuel inbound and manufactured products outbound. Farm machinery, shoes, clothing, processed foods, automobiles, electrical machinery and publications are among the major outbound commodities. Coal, iron and steel, lumber, building materials and grain account for heavy inbound movement. Low grade fuel is abundant nearby, but high quality coal is hauled from more distant fields, such as the Donets basin in the South.

Leningrad is second only to Moscow in output of manufactures and in population. Its shipyards and its electrical goods and heavy machinery production are Russia's largest. Tires, chemicals, engines, textiles, shoes and paper are important products, and some grain, lumber and fertilizers are exported. Leningrad has five stations serving seven radiating railroads.

Coal is widely distributed in Soviet territory. The most important mines are in the Donets basin, near **Stalino** and **Krasny Liman;** in the vicinity of **Tula,** near Moscow; in western Siberia near **Karaganda;** in the Ural region around **Kizel;** in the Kuznetsk basin near **Kemerovo** and **Abakan;** and in the far northern Pechora basin, near **Vorkuta.** Coal moved from these and other origins aggregates a fifth or more of all freight handled by the Soviet railroads.

Domestic and commercial fuel requirements in the large cities are of course substantial, and account for a considerable part of the coal movement, but the needs of the metallurgical and industrial centers dominate the coal traffic pattern.

Soviet centers of heavy industry, particularly iron and steel manufacture, are fairly well separated geographically. **Stalingrad,** on the Volga, is the site of the big Red October steel mills and a variety of tributary plants making tractors, tools and machinery. **Magnitogorsk,** with the Soviets' largest steel mill, the Stalin works, is a good example of the severe limitations of Soviet railroad capacity. This major metallurgical center, a city about the size of Tulsa, has only one railroad, a double-track branch line. **Stalinsk,** deep in Siberia, has important steel works, and other iron and steel mills are situated at **Kerch** in Crimea, **Tbilisi** in the Caucasus, **Chelyabinsk** in the Urals, **Stalino** and **Dnepropetrovsk** in the highly industrialized Donets basin, and in the environs of **Gorki. Krasnoturinsk** and **Volkhov** are major centers for aluminum refining. **Kyshtym, Balkhash** and **Karsakpai** have large copper refineries.

These metallurgical centers have developed generally near the basic ore deposits, so the rail haul of ore usually is short. The mills at Stalinsk, for example, draw on ore deposits at **Temir-Tau,** a haul of 45 miles, and Magnitogorsk is even closer to its ore pits. On the other hand, ore movement to the mills in the Gorki area and Stalingrad, mostly from the **Krivoi Rog** mines in the Ukraine, runs into relatively long hauls.

Sources of high-grade coal are much farther from the principal mills, however, and an important function of the Soviet railroads is to keep such centers supplied. Magnitogorsk, for example, depends for coal largely on mines around Karaganda (about 750 miles) and Abakan (about 1,500 miles).

A large part of the steel, aluminum and copper output goes into heavy machinery required for Soviet industrial expansion, and machine tools, mine and farm and power plant machinery, locomotives, aircraft and automobile components and military equipment constitute important railroad tonnage. **Sverdlovsk,** site of the Uralmash works, is a top-ranking heavy machinery manufacturing center; it also produces steel, electrical equipment, building materials, paper, chemicals and other heavy freight.

Kharkov is a major machine-building center; others are **Kolomna** (locomotives and diesel engines), **Krasnoyarsk** (agricultural and oilfield machinery), **Kuibyshev, Orsk, Omsk, Nizhni Tagil** (freight cars), **Novosibirsk** (trucks, farm and mine machinery), **Voroshilovgrad** (locomotives), **Molotov, Minsk** (tractors), and **Rostov-on-Don,** where the Rosselmash works are the No. 1 Soviet farm machinery producer. **Chelyabinsk** has Russia's biggest tractor plant, and **Gorki** leads in the output of automobiles.

Russian railroads handle a large volume of building materials, but the hauls generally are fairly short. **Briansk, Karaganda, Minsk, Volsk** and **Novorossisk** ship cement in quantity. Lumber bulks large in traffic statistics, much being moved from the northern and Siberian forests to the big population centers of western and southern Russia. **Vologda, Ufa, Tomsk, Tavda, Saratov, Vorkuta, Kotlas, Kirov** and **Astrakhan** are among the major lumber trade centers.

The chemical industries are of growing importance as sources of Soviet railroad freight. The need for fertilizers is increasing in the older grain producing regions, and uses of industrial chemicals are multiplying. Among major shipping points for chemicals, either raw or processed, are **Solikamsk, Chulak-Tau, Chelyabinsk, Kazan, Kemerovo, Molotov, Sol Iletsk, Vilna, Nizhni Tagil** and top-ranking **Berezniki.** In addition, several of the steel-mill centers produce a substantial volume of coke oven by-products. Synthetic rubber, in demand for both military and commercial purposes, is made at **Yaroslavl, Kazan, Erevan, Voronezh** and **Kuibyshev.**

The petroleum industries produce substantial tonnage, even though pipelines and waterways carry a lot of the crude oil output. Russia's biggest oil fields, in the Caucasus, supply refineries at **Baku, Grozny, Krasnodar, Batumi** and other points in that area, and there is a large movement of crude from Baku, **Guryev** and **Krasnovodsk** to other refinery centers, such as **Stalingrad, Saratov, Syzran, Kuibyshev** and **Gorki,** whence refined products move by rail.

In the Soviet area food processing, especially canning, meat packing and flour milling, is largely localized at the chief points of consumption, and railroad traffic in such commodities, for a country of such size, is not too significant. On the other hand, such basic foodstuffs as wheat are handled in substantial volume. The chief function of the railroad between Novosibirsk and Tashkent, for example, is to move wheat from Siberia into central Asia, and to haul cotton out of hot central Asia to the textile mills in the big industrial towns in the North. Among the grain trade centers are **Kiev, Odessa, Penza, Petropavlovsk** and **Nikolaev. Kokand, Tashkent, Samarkand** and **Bukhara** are cotton shipping centers. In addition to Leningrad and Moscow, **Ivanovo, Gomel, Barnaul, Yaroslavl, Novosibirsk** and **Kaunas** have major textile mills.

How the Russians Run Railroads

Is it true that freight traffic density on Soviet railroads is 90% higher than in the United States? Yes, says the author. And that Soviet car-miles per car-day run 95% above American levels? Yes again. But how can it be true, then, that Soviet gross ton-miles per freight train-hour are less than half as high as ours? This article supplies the answer.

Do the state-operated railroads of Russia give their customers as much service as private U. S. railroads do? This article shows how the shipper in the USSR is forced to tailor his needs to the railroads' convenience—to load and unload freight cars at breakneck speed—and make up trainload consignments whenever possible.

By HOLLAND HUNTER
Associate Professor of Economics, Haverford College

Probably the most important difference between Soviet and American railroad practice lies in their relations with the senders and receivers of freight. In the United States, the typical railroad attitude toward customers stresses a willingness to serve and eagerness to retain or obtain business. Not so in the USSR. Since the middle 1930's, although the railroads' duty to provide prompt and reliable freight service has been recognized, the balance of power has been on the railroads' side. They are not anxious to obtain more business. Instead, government policy stresses the *duty* of shippers and receivers to keep their demand for freight transportation to an absolute minimum, and if possible to use other carriers instead of the railroads. This helps the hard-pressed railroads, but frequently injures the customer.

Railroad officials in Russia are under pressure to minimize their costs. But so are the managers of steel plants and all the other senders and receivers of railroad freight. Clashes of interest arise, and they cannot be exorcised merely by "government ownership of the means of production." Tractor factories and railroads, for example, are both owned by the state, yet their respective interests in matters of freight transportation may diverge significantly.

Take the matter of trainload consignments as an illustration. Railroad operating costs can be substantially reduced by loading an entire train at one point of origin, with all cars consigned to a single destination. But consider the effects for the shipper and receiver. For them, the smooth flow of relatively small receipts and shipments which would minimize their own operating costs is replaced by intermittent mass arrivals and departures.

"Soviet railroads are not anxious to obtain more business"

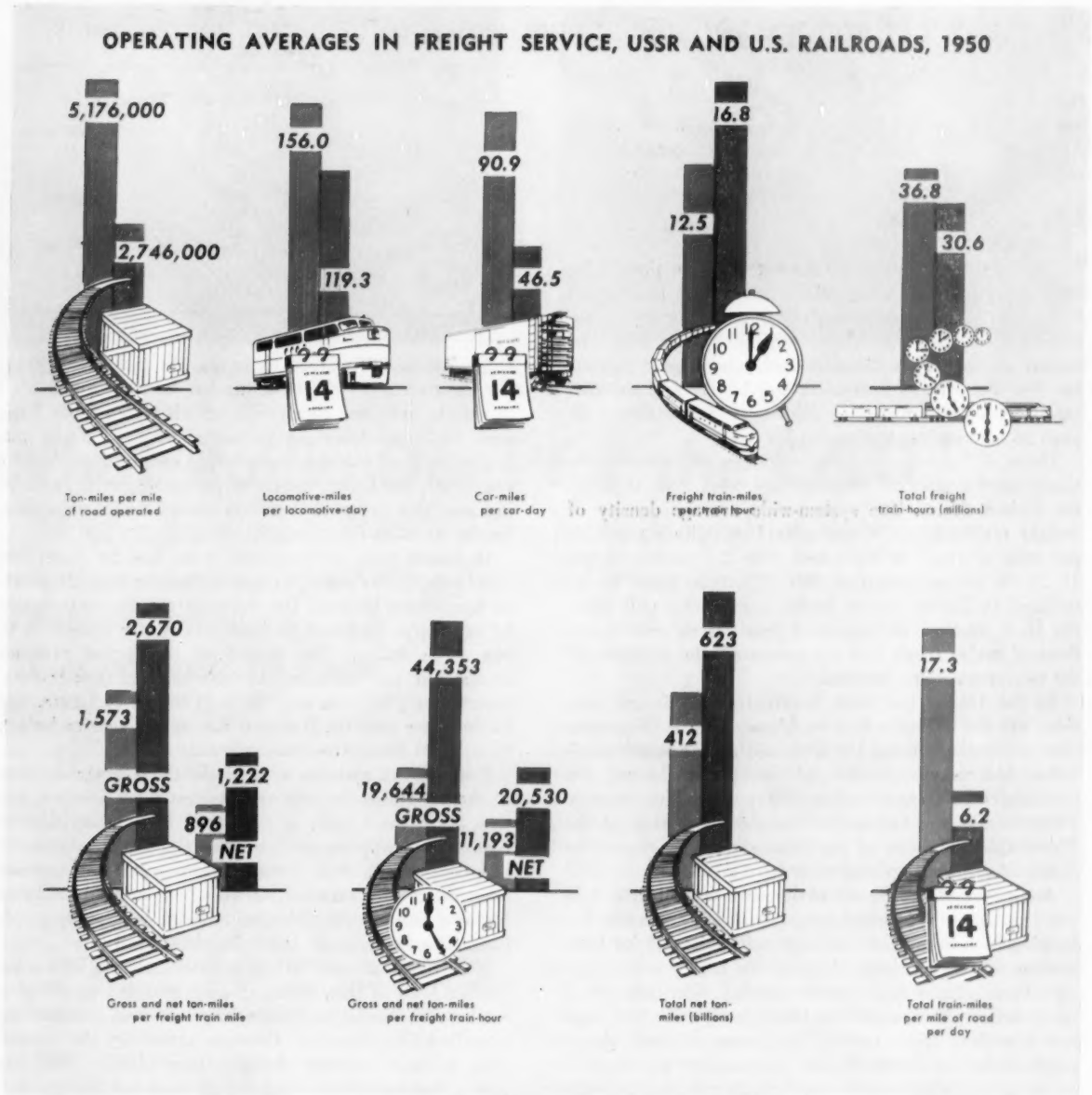
Trainload consignments are, of course, familiar in the United States for commodities like coal and iron ore. But in the USSR the railroads strive to extend the practice to many other commodities, involving shippers for whom the practice is, to say the least, highly inconvenient. American railroads will call for and deliver even single cars, but Soviet railroads are reluctant to provide such service. Soviet shippers and consignees are under pressure to arrange their demands so as not to complicate the railroads' work.

In the United States shippers are allowed 48 hours free time for loading and unloading of freight cars, and a car may spend as much as 140-180 hours on a single trip being loaded and unloaded. Soviet railroads are not so generous. In fact the emphasis on prompt loading and unloading has been so extreme during the last twenty years that in one year an average of 32 hours was achieved, and the figure has never risen above 60-65 hours. The Russian tradition of relatively high demurrage charges was intensified in the 1930's, and has been reinforced through the application of criminal proceedings against plant officials who systematically delay freight cars. This means, in effect, that Soviet railroads can force their clients to load and unload straight around the clock, regardless of cost and inconvenience.

Another difference grows out of the peculiar mixture of new and old equipment on the Soviet system. The original network was based on European steam railroad practice, using light trains with a high density of movement. Partly at the suggestion of U. S. technical consultants, the Soviets in the 1930's began to introduce heavier trains in the American pattern, with more powerful locomotives, large four-axle freight cars, and substantially improved roadway.

The intention was to "combine the best features" of European and American practice—heavy trains *and* high density. But these things take time, and at present the Soviet railroad system is a unique example of contrasts. On important trunk lines, improved roadway has made possible the introduction of American-type freight locomotives and freight cars, while secondary branch lines are still operated with light, old-fashioned equipment. Even on the modernized trunk lines, the roadway and equipment in general correspond to American practice of about twenty years ago, with a few recent improvements added.

This article is based on a chapter in Professor Hunter's *Soviet Transportation Policy*, a study now nearing completion. Through several years work in American libraries, he has assembled from Soviet technical books, journals, and the railroad newspaper a detailed record of transport development. In 1949, an earlier version was accepted by Harvard University as his Ph. D. dissertation. The book will deal with overall Soviet policy in developing new areas with a minimum investment in transport facilities, and will review the financial aspects of planning freight and passenger traffic growth.



SOURCE NOTE: Soviet statistics are questionable because of the secrecy surrounding their compilation. The coverage and meaning of fragmentary releases are frequently unclear. However, railroad operating statistics can be subjected to numerous cross-checks for internal consistency. The figures above have been compiled directly from Russian-language technical publications and meet such tests. Their coverage in each case is comparable to analogous U.S. measures, and the comparisons presented are thus believed to be accurate.

Only two or three per cent of Soviet motive power is electric or diesel-electric—all the rest is steam. This again puts the USSR back at the U. S. position of the early 1930's. Since both diesel-electric and electric locomotives outperform steam in many respects, Soviet reliance on steam places the system at a disadvantage in comparisons with current U. S. practice.

Before the inception of the "Five-Year Plans," the Soviet freight car fleet consisted mainly of two-axle cars with hand brakes and hand couplings, and a capacity around 18 tons. By 1950, the fleet had been partially modernized. Thirty-six percent of the stock then consisted of 4-axle cars, 53% had automatic couplings, and 76% had automatic brakes. Nevertheless, it is clear that train speeds, train weights, and labor efficiency all suffer from the continued presence of obsolete rolling stock.

In the field of signaling, amazing contrasts exist. Short, experimental sections of main lines are being operated with CTC, automatic train-control, or automatic cab-signaling. Most of the trunk routes have at least semiautomatic block signaling. But on the bulk of the network, train movement is controlled by an electrified version of the old Webb-Thompson-Smith train staff system, which in 1940 accounted for about 70% of the road operated. Track capacity and train speeds clearly are limited by this kind of equipment, as compared with U. S. practice.

Train speeds and operating safety are also impaired

"If trains perform poorly, the Soviet answer is to run more trains."

by continuing deficiencies in the quality of roadway. Ballast, ties, rails, track alignment, and gradients on all but the most improved stretches of line would shock American operating officials. In 1950 the average weight of rail in the United States was 102 pounds per yard. In the USSR it was 74 pounds in 1945, with a target for 1950 of 91 pounds.

These differences in roadway, signaling equipment, freight cars, and motive power act to place the Soviet railroad system at a substantial disadvantage in comparisons with American railroads. On the other hand, the high-handed attitude of Soviet railroads toward their customers gives the Russians certain advantages. Let us see how these two forces work out in terms of the major indexes of performance efficiency. The diagram on page 25 summarizes the record for 1950.

Three of these indexes show how much more intensively Soviet railroad facilities are used than those in the United States. The system-wide average density of freight traffic in 1950 was over five million ton-miles per mile of road, as compared with 2.7 million in the U. S. Of course, much of this difference must be attributed to lightly loaded feeder lines which pull down the U. S. average. If maximum densities on certain sections of major trunk line are compared, the positions of the two systems are reversed.

In the USSR, the most heavily-traveled freight sections are the 110-mile Krasny Liman-Osnova line southeast of Kharkov in the Ukraine, and the 82-mile Novosibirsk-Chulymskaya portion of the Trans-Siberian. On each the annual density was about 27 million tons in 1950. But on the Columbia-Shocks Mills section of the Philadelphia division of the Pennsylvania, a density of about 74 million tons was recorded in 1944.

An inadequate stock of locomotives and freight cars has led the Soviet railroads to strenuous measures for keeping both in motion—average daily mileages for locomotives are 31% higher than in the U. S., and freight cars move almost twice as far per day. The latter obviously reflects the curtailed loading and unloading time noted earlier. These comparisons overstate the relative productivity of Soviet freight locomotives and cars in terms of ton-miles moved, since tons per locomotive and per car are considerably lower in the USSR than in the U. S. Nevertheless, the performance of Soviet motive power and rolling stock is impressive.

Another group of bars in the chart show the low level of performance which results from Soviet operating conditions. Freight train speeds, on a terminal-to-terminal basis, are only three-quarters as high as American speeds, and running speeds would be relatively lower. Train weights are similarly far below American standards. As a result, in gross ton-miles per freight train-hour, the most inclusive index of operating performance, the 1950 Soviet figure was only 44% of the U. S. average.

In the late 1920's, the gross weight of Soviet freight trains was only half the American level. During the 1930's substantial progress was made in the USSR, and the Soviets appeared to be catching up. However, in recent years marked advances have taken place on U. S. railroads, while Soviet train weights suffered from war and postwar difficulties. Consequently the Soviet position relative to the United States has been set back.

GROSS TON-MILES PER FREIGHT TRAIN-MILE

Period	USSR	US	USSR as percentage of US
1926-1930	924	1,817	51
1931-1935	1,085	1,763	62
1936-1940	1,370	1,939	71
1941-1945	(a)	2,313	
1946-1950	1,458	2,497	58

(a) Not available

This is only one illustration of what frequently happens in Soviet-American industrial rivalry. While the Soviet government strives to reach and surpass American levels, the United States target proves to be a moving one. Our progress therefore makes Soviet objectives harder to attain.

If Soviet train performance is so low by American standards, it may seem impossible that the indicated traffic figures can be true. But the apparent discrepancy can be explained. If trains perform poorly, the answer is to run more trains. The output of the Soviet railroad system, in net ton-miles of revenue and non-revenue freight per year, was only 66% of the U. S. figure. Yet in the same year the Russians ran up 18% more freight train-hours than American railroads did!

For the two systems as a whole, the average number of freight trains to pass over a stretch of line per day was 17 in the USSR, as compared to 6 in the United States. Evidently we can visualize a thick population of relatively light, slow freight trains constantly spread over the Soviet railroad network, while in the United States a much more elaborate network is sparsely populated with heavier and faster freight trains.

The picture is now fairly complete. Starting with a far smaller total of line, motive power, and rolling stock to work with, Soviet railroads have attained outstanding overall traffic densities through crowding the system with a large number of light, slow trains. This has meant that locomotives and freight cars are kept on line more continuously than in the United States. At the same time, the ton-mile productivity of trains, locomotives, and cars is substantially below American levels.

In view of the circumstances confronting Soviet railroads, this type of operating practice is economically justified. Skilled labor has been scarce in the USSR, but capital equipment has been much scarcer. The regime has refused to provide the railroads with an investment program adequate to keep pace with traffic demands. Consequently the hard-pressed managers of Soviet railroads have logically intensified their use of roadway, motive power, and rolling stock, at the same time employing excessively large quantities of labor from an American standpoint.

One final observation is indicated. The trend disclosed by comparison of gross train weights over twenty-five years is duplicated for the other statistical series tabulated. The Soviet railroads have clearly been improving, and must be expected to continue to improve.

ENGINEER advises operator of the train's arrival time at the railroad crossing and asks if it will be clear.

WAYSTATION OPERATOR answers engineer via radio informing him when the crossing will be clear.

What Radio Does for the C&O

- Reduces the number of train stops, particularly at interlockings
- Reduces time spent by through freight trains on the road between terminals
- Cuts delays to all trains

Operating benefits are the result of installing two-way radio on 38 cabooses, 71 locomotives (diesel "A" cab units) and in 6 wayside stations on the Chesapeake & Ohio double-track line between Columbus and Toledo, Ohio, 120 miles.

Other roads cross the C&O at six interlockings between Columbus and Toledo. An important factor in the operation of heavy coal and ore trains is avoiding stops at these interlockings. Accordingly fixed wayside radio stations were installed at four of these interlockings: Delaware-CCC&StL; Marion-Erie, PRR, CCC&StL; Upper Sandusky-PRR; and Fostoria-B&O, NYC, NYC&StL. Oher communications are available at interlockings at Carey-AC&Y, CCC&StL; and HV Jct. (near Columbus yard)-PRR, CCC&StL. Previously trains proceeded at normal speed and took a chance on "getting the crossing" when they approached. In too many instances, they were required to stop. Now, when approaching, within about eight miles of each interlocking, the engineer radios the leverman giving his expected arrival time at the crossing, and the leverman replies stating whether he can give him the crossing at that time. If not, the leverman may say, "Erie is on the approach now, I suggest you slow down to get here about 9:40." Accordingly the engineer reduces speed, but keeps moving, so that he gets his signal and goes through the interlocking without stopping.

Coal and Merchandise Are Big Movements

During 1953, the C&O moved 14,000,000 tons of coal and 3,000,000 tons of iron ore over this division. Coal moves north to Toledo; iron ore moves south to Portsmouth and Jackson, Ohio. Three-unit, 4,500-hp diesel-electric locomotives, consisting of two cab units and a power unit, move these trains. Iron ore is handled in 100-car trains averaging 7,500 tons, and coal in 160-car trains averaging 12,500 tons. The main ore and coal movement is between Wednesday noon and Monday morning in the period from April through November, the Great Lakes shipping season.

The Clinchfield delivers citrus fruit from Florida, as well as peaches and apples from the Carolinas and Georgia, to the C&O at Elkhorn City, for delivery to Chicago, Toledo and Detroit. Three merchandise trains are operated each way daily; Toledo-Columbus-Russell, with coal, ore and fruit runs being made as extras as traffic warrants. One passenger train is scheduled each way daily. Total traffic will average 12 trains daily, approximating 30 trains during the peak shipping months in the summer and when coal and ore movements are heavy.

Radio an Important Operating Tool

Considerable saving in time and a reduction in operating expenses have been accomplished since the installation of radio on freight trains and in wayside offices. Practically non-stop runs are now being made by through freights from Columbus to Toledo.

Advantages of radio operation on this line are:

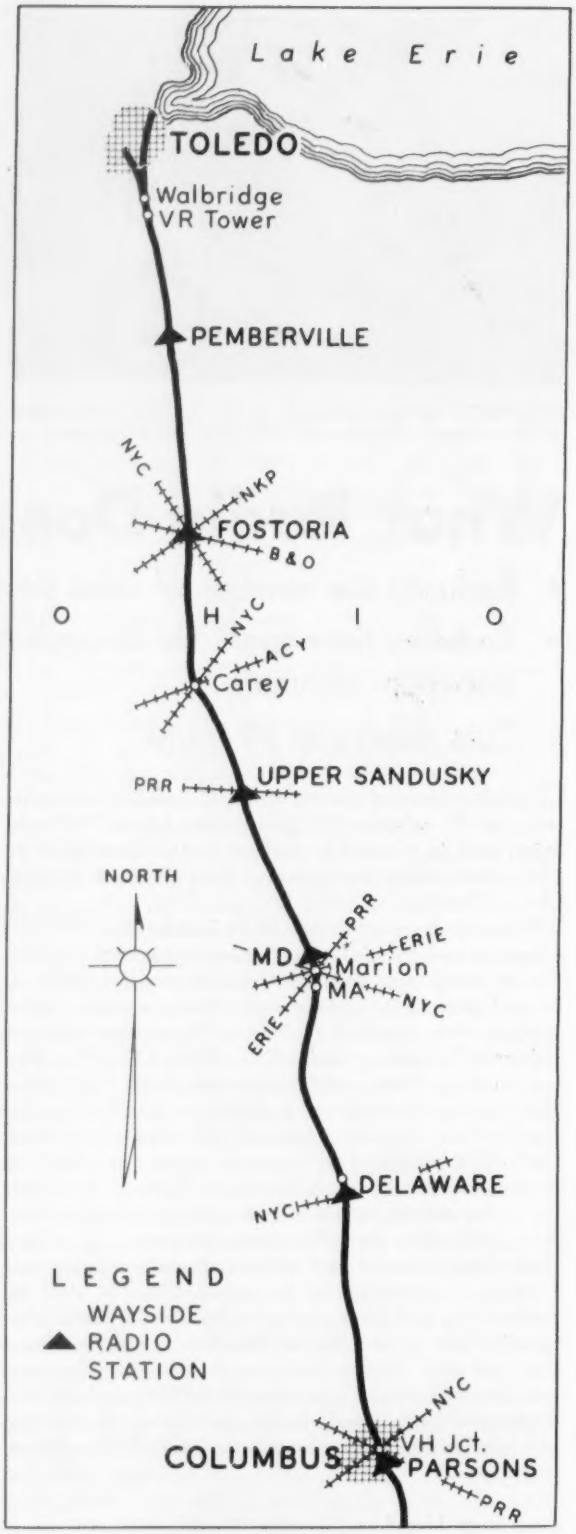
- **The dispatcher can more efficiently plan moves**
- **Trains don't block highway crossings**
- **Complete train inspection information is quickly given to all interested persons**
- **Reduced delays when trains stop in emergencies**
- **Verbal orders enable trains to leave terminals promptly**
- **Everyone is kept informed concerning operations**

The dispatcher's board shows where trains are, but he often doesn't know how long it will be before a delayed

CONDUCTOR uses radio to give his engineer a verbal highball.

RIGHT—Part of the C&O route from Ashland and Russell, Ky., to Toledo, where connections are made with the Pere Marquette district of the C&O. At Toledo, the C&O has extensive facilities for handling coal and iron ore between freight cars and lake boats. From Ashland, lines run east through the industrialized Kanawha Valley and coal fields in West Virginia and Virginia to Richmond and Newport News, on the Atlantic Coast. Also from Ashland, a line extends south through Kentucky coal fields to Elkhorn City, Ky., where the C&O connects with the Clinchfield. At Russell, near Ashland, the C&O has a large retarder yard where freight cars are classified for routing either north to Toledo, or west to Cincinnati and Chicago.

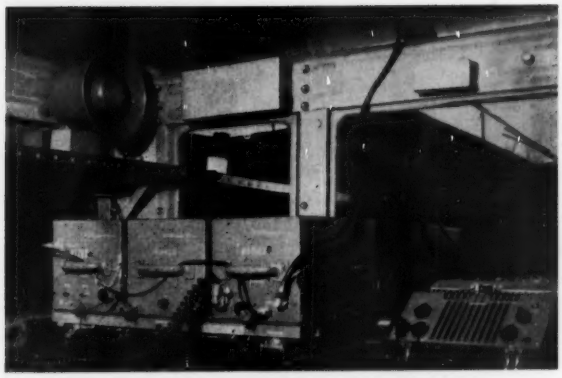
The line between Columbus and Toledo is generally level with grade and curvature so slight that they do not appreciably affect train speeds. Maximum authorized speed is 75 mph for passenger trains and 50 mph for freight trains. The railroad is double track with center sidings. The two main tracks are signaled for right-hand running, except for 20 miles between Delaware and Marion, where each track is signaled for either direction running. The dispatcher, by means of centralized traffic control, can operate signals and switches at the ends of sidings and some main-track crossovers. He has a control machine with a track diagram indicating locations of trains on main tracks.



train moves out of a particular section (between sidings or stations). With radio, he can call the operator at the wayside station nearest the train and ask him to call the train. The operator, after talking with the train crew, can tell the dispatcher about the delay, and the crew's estimate of their arrival time at the next station. Thus the dispatcher is better able to plan his moves because "instantaneous pin-point" spotting of trains is available with radio communication. When he must put a train in a siding to allow another train to pass, he calls the wayside operator nearest the trains involved, and tells him what is to take place, so the operator can inform the train crews.

Semi-Privacy with Single-Channel Receivers

All end-to-end and train-to-train radio calls are made on channel 1 (160.41 mc). For calls between wayside offices, channel 2 (161.31 mc) is used. To obtain semi-privacy, single-channel receivers and dual-channel transmitters are used. Wayside office receivers pick up calls only on channel 2, while receivers on trains pick up calls only on channel 1. Thus wayside operators normally do not hear calls between trains, or between engineers and conductors on the same train. Likewise, train crews do not hear calls between wayside operators. When the way-



LABORATORY CAR FOR FIELD SURVEYS

The C&O communications department has a division maintenance motor car, DM-12 to make field surveys for locating base radio stations, for checking the operation of existing stations, and for checking the coverage of mobile equipment on freight trains. The car, a converted school bus, is mounted on flanged wheels enabling it to run on the rails. When on the line it is run as an extra train.

The DM-12 duplicates, as near as possible, the conditions of mobile stations on a caboose or locomotive. The laboratory car contains a complement of FE radio equipment, gasoline engine power supply, Brush recorder, and antenna. Conditions are more severe in that the antenna on a locomotive or caboose is at a higher elevation than that on the car, which would give the car radio less range, generally speaking. Hence, if a wayside base station can be received by the laboratory car, a train at the same location could also receive from that base station. The DM-12 is used to check for the worst possible conditions of transmission and reception.

side operator desires to call a train, he switches over to channel 1, and calls the train. When an engineer or conductor calls the wayside operator, he switches over to channel 2 and makes the call. To call the dispatcher in an emergency, the conductor switches over to channel 2, and before speaking he depresses the "dispatcher key" for a few seconds. This operation transmits a tone which serves to connect the radio equipment at the nearest wayside station to the dispatcher's telephone line.

The division superintendent at Columbus has two-way radio in his car, which is equipped with a dual-channel transmitter and dual-channel receiver, so he is able to talk to, or monitor conversations of, operators and train crews.

Radio Equipment Is Unitized

The radio equipment is Westinghouse Type FE consisting of three plug-in units: transmitter, receiver and power supply. The radio equipment operates on 115 volts a-c supplied by a Cornell-Dubilier vibrator-converter on locomotives and cabooses, and by commercial sources at the wayside stations. On the locomotives, the radio is mounted in the nose, with the handset, loudspeaker and controls in the cab, and the antenna on the cab roof. In the cabooses, the radio is under one of the cupola seats, with the controls, handset and loudspeaker on the cupola wall. The cabooses have a 12-volt d-c power supply system using a Dayton V-belt drive off an axle which drives a Leece-Neville generator which charges a storage battery to supply the vibrator-converter.

Battery, charging equipment and vibrator-converter are under a seat bunk at one end of the caboose. An air vent, in the caboose side wall, provides ventilation for the battery. A cable runs from the battery to a Pyle-National charging connector, mounted under the caboose between the trucks, and accessible from the outside.

The radio station at Columbus is in the dispatcher's office with control equipment only. Columbus is connected to the wayside stations by the dispatcher's telephone line. To call a moving train fom Columbus, the dispatcher first contacts by telephone the wayside station nearest the train. He requests the wayside operator to connect the radio equipment to the wire line. This is done by the local wayside operator momentarily depressing the "line-on" switch lever. The dispatcher then places his jack plug in the radio jack, channel 1, and calls the train. When the call is completed, the dispatcher "signs off" using the waystation call-letters. He then removes the jack plug from the radio jack. The waystation connection to the dispatcher's line automatically drops out after approximately 15 sec. The dispatcher's line is then available for telephone use.

NINE OFFICES CAN CALL TRAINS

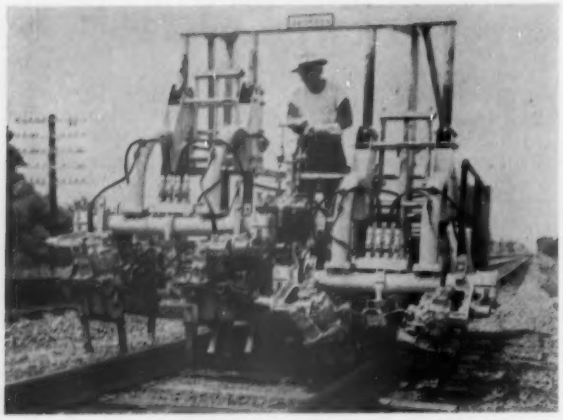
Crews of moving trains can talk, via radio, to nine different C&O wayside offices: (1) Columbus dispatcher's office, (2) Parsons yard, (3) Delaware, (4) MA cabin, Marion, (5) MD cabin, Marion (6) Upper Sandusky, (7) Fostoria, (8) Pemberville, and (9) VR tower, Walbridge yard.

Radio Maintenance Program

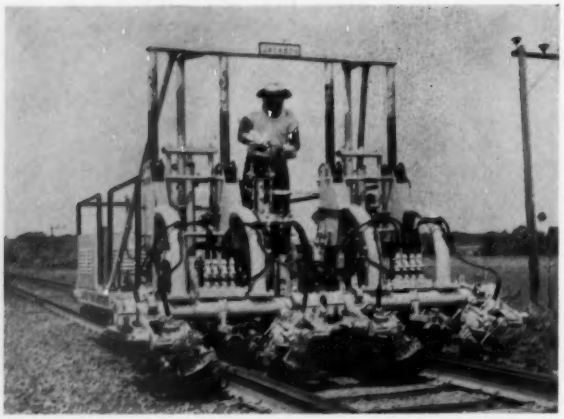
The C&O has an extensive radio maintenance program, operating six electronic maintenance shops—three (Russell, Columbus, Walbridge) staffed with five men, and three (Newport News, Richmond and Huntington) staffed with two men—as well as a central records bureau at communications department headquarters in Richmond, Va. At least one man at each shop is an electronic equipment maintainer, the others are electronic equipment installers. The maintainer has at least a second class FCC radio-telephone operator's license, and the installers are in training to obtain FCC licenses, if they have not already obtained them. The three shops at Russell, Columbus and Walbridge servicing main line radio are open 24 hours a day, seven days a week.

The communications department at Richmond compiles a monthly analysis of radio troubles. These monthly records have revealed recurring failures which can often be eliminated by changes in techniques of servicing, or by modification of existing equipment. The monthly trouble chart also reveals the service life of the units. The average service life for receivers checked during a recent month was 2.1 months, and the average transmitter life was 3.6 months. Analysis has shown, for example, that the major weakness is tube failure.

This radio project was planned and installed by railroad personnel under the direction of P. A. Flanagan, assistant superintendent of communications. The major items of radio equipment were furnished by the Westinghouse Electric Corporation.



SPLIT-CROSSHEAD feature of the Jackson Track Maintainer allows the operator to tamp the ties under either or both rails. This feature facilitates the tamping of ties through turnouts—locations which otherwise must be tamped by hand.



SIMULTANEOUS TAMPING of both rails is illustrated by this view. The machine is doing spot-tamping work on the Burlington where it performed at the rate of approximately 9 seconds per tie tamped—averaging about 470 ft of track per hour.

NOW BEING DEMONSTRATED . . .

Dual-Purpose Production Tamper

Machine employing vibratory principle and having a split crosshead is designed for spot-tamping or out-of-face surfacing

The Jackson Hydro-Electric Track Maintainer, a recently developed tie-tamping machine of entirely new design, is now undergoing demonstration tests under a variety of working conditions on a number of roads. The new unit is a product of Jackson Vibrators, Inc., and is sold by the Electric Tamper & Equipment Co., Ludington, Mich. Rather than replacing the less expensive Jackson Multiple Tamper, the Track Maintainer is intended to supplement the Multiple Tamper by providing an adaptable dual-purpose unit which will spot-surface track in addition to carrying out production surfacing. The dual nature of the machine is derived partly from the fact that it has a split crosshead so that it may be used to tamp under either or both rails, separately or simultaneously.

Uses Vibratory Principle

The familiar Jackson vibratory tamping principle has been retained in the new machine. However, it is said that the effectiveness of the tamping heads has been increased about five times through the use of a specially designed electric vibratory motor which operates in a frequency range of 4,000 to 4,500 vibrations per minute.

The tamping heads are mounted in two independent groups of four units each, one group to each section of the split crosshead. The tamping units in each group are so arranged on the crosshead that each will enter one of the four quadrants formed by the intersection of the rail and the tie. Two hard-tipped tamping bars are carried by each tamping head. These are available in interchangeable 2-in., 3-in. and 5-in. widths to accommodate the full range of ballast classifications and conditions as well as track lift. Each tamping head and its motor is hung from a "lazy hinge" to which it is attached by a shock-absorbent support of heavy belting.

The crossheads are each raised and lowered vertically by a double-acting hydraulic workhead ram. The downstroke pressure is controlled by the operator, as required, to achieve full penetration of the tamping bars. The depth of penetration of the tamping heads is controlled manually by the operator, with the insertion of stops in a limit bar near the operator's station. The depth of penetration, which is adjusted to fit the various heights of rail, is usually set at 4 in. below the bottom of tie for maximum effectiveness. It may be varied, however, to make allowances for the rail section, height of lift and the type of material in which the machine is operating.

How Used on the Burlington

The machine was recently seen in operation spot-surfacing track on the high-speed main line of the Burlington between Aurora, Ill., and Galesburg. Operating in compacted slag ballast, with a labor force comprising a machine operator, three laborers, two flagmen and a track foreman, the machine was tightening loose ties and correcting cross-level in a demonstration designed to show its adaptability to this kind of work. In this operation the machine was working on track consisting of 131-lb rail laid on oak ties spaced 24 to the rail panel and supported on blast-furnace slag ballast. The tie condition was good. The ballast, however, was consolidated as a result of some churning and pumping action of the

joints. The spotting necessary to restore the track surface at the joints amounted approximately to ½ in.

Four jacks, two to each rail, were operated ahead of the Track Maintainer. A single jack was placed under the rail at the center of each depression and the rail was raised by eye to the normal running surface of the track. If the level board indicated a variation in cross-level, the opposite rail was brought up to level.

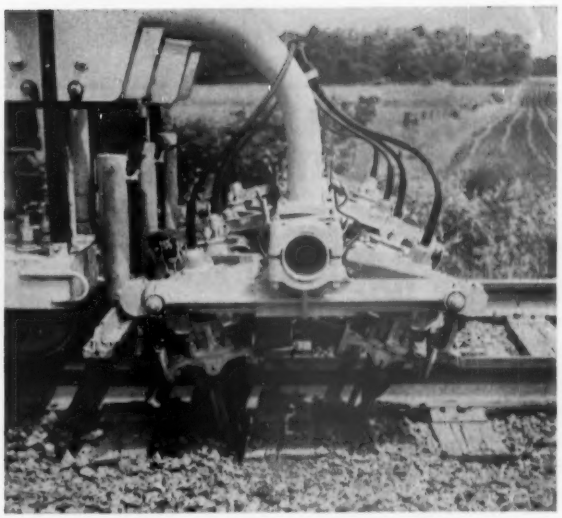
In operation, the machine tamped the ties successively up to the jack, tightening either or both ends as might be required. The jack or jacks were then removed and carried ahead of the next depression, while the tamper completed the tightening of the remaining ties in the designated area. The spotting of the machine over each tie was expedited by the hydraulic indexer. Under the control of the operator this device, which is powered by a gear-type fluid motor, moves the machine the short distance between ties.

Three insertions of the tamping head were usually sufficient to break the mud sock around the sides of a tie and bring it to good bearing. When the crosshead was lowered, the tamping heads, suspended on their "lazy hinges," moved torsion-pendulum fashion toward the tie-rail corner of the tamping quadrant due to the torque exerted by the tamping head motors. The positive downward thrust of the crosshead, coupled with the vibratory action of the tamping bars, broke the bond of the compacted ballast, while the "spooning" action of the pendulum movement forced the ballast material from the cribs into the pillar under the tie in the tie-rail zone where the vibratory action of the tamping bars compacted it immediately under the rail.

Performance of the Machine

Timing of the work over a number of ties disclosed that an average of slightly more than 9 seconds was required to tamp each tie. It has been reported that this machine averaged 470 ft of track an hour on 35 miles of work carried out during demonstrations on several railroads, which included both out-of-face and spot surfacing, with lifts from zero to 7 in. and a wide variety of ballast conditions.

An average tamping production rate of slightly better than 510 track-feet per hour was reported for the machine on another railroad. On this job the machine made three insertions of the tamping head per tie on a 3-in. lift in free-running granite ballast on track laid with 24 ties per 39-ft rail panel.



POSITIVE PRESSURE is applied on the workhead of the tamper to achieve full penetration of the tamping bars, even under conditions of highly compacted ballast. Each tamping head is equipped with two hard-tipped tamping bars and is suspended from a "lazy hinge" by a shock-absorbent support.

How It Is Set Off

A set-off system permits the machine to be quickly removed from the track to clear for revenue traffic. Actual removal from the track was timed at somewhat less than two minutes after the machine had arrived at a set-off location. Approximately the same amount of time was required to return the machine to the track. In the set-off operation the equipment was lifted vertically by means of two built-in hydraulically operated jacks, one at each end of the tamper. After the machine was raised, insulated run-off rails were laid across the track rails and joined to those of the set-off. The machine was then lowered until four permanently mounted transverse set-off wheels contacted these rails, the jacks were completely slacked off and the tamper was pushed into the clear.

GENERAL SPECIFICATIONS OF THE TRACK MAINTAINER

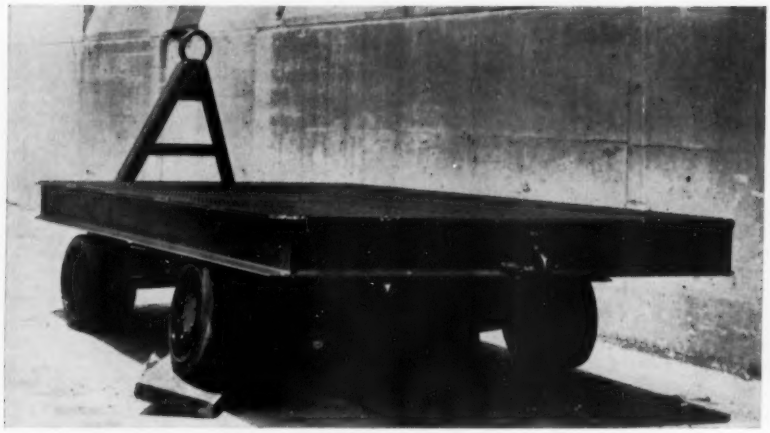
This machine is equipped with a Ford four-cylinder industrial engine for chassis propulsion. The engine develops a maximum of 40 bhp and provides a maximum transit speed of 25 mph. The machine has a four-wheel drive and three speeds both forward and reverse. A Vickers hydraulic Power Pac, driven from the engine fan belt, supplies power for the set-off system.

For operation of the generators that furnish power to the tamper heads and the main hydraulic system, a Ford six-cylinder industrial engine is capable of producing 55 bhp at an operating speed of 1,600 rpm. This engine is equipped with a mechanical governor and clutch. Two generators rated at 7.5 kva each, and operated at a speed of 2,260 rpm, are driven from the main engine shaft through a V-belt tightened by an idler sheave. Each generator is equipped with an individual voltmeter. The pump for the hydraulic system is driven directly from the main shaft of the engine. This pump is a dual-output mobile type and has an output of 14 gpm (600 psi) from each half at the operating speed of 1,600 rpm. These pumps furnish the power for the double-acting workhead rams, which have an effective diameter of 2¼ in., and to the hydraulic indexer. An emergency hand pump has been provided in case of failure of the main pumping system.

The tamper has an overall length of 16 ft, a maximum width of 9 ft. 8 in. and an overhead height of 7 ft above the top of rail. The chassis platform is 8 ft by 11 ft, and the machine has a total weight of 12,300 lb. The axles, which may be either insulated or uninsulated, are 2½ in. in diameter and mount 16-in. cast-steel wheels. The main gasoline tank has a capacity of 40 gal and there is an auxiliary tank of 15-gal capacity. A 60-gal tank handles the hydraulic oil reserve.

ADVERTISERS IN THIS ISSUE

What's New in Products

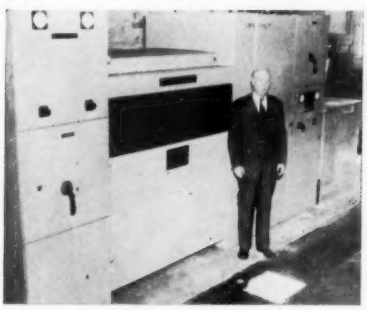


Axles Permit Trailer To "Walk Over" Bumps

Mercury Manufacturing Company, 4044 South Halsted st., Chicago 9, has developed a heavy-duty trailer which uses compensating rear axles to prevent load shifting over rough terrain.

The new unit has a capacity of 15 tons; width is 60 in.; length 120 in., and platform height 22¾ in. It is fitted with a 3/16-in. checkered steel deck, a loop handle hitch and a C-type coupler on the rear. Wheels are 15 by 8 by 11¼ in. with pressed-on solid rubber tires.

Timken roller bearings are used to mount the four rear wheels on two compensating axles. Steering is by a fifth-wheel double-ball-bearing race turntable •



Rectifiers for Shop Power

The New York, Ontario & Western's recently installed General Electric mercury arc rectifier has been saving the company over $1,000 a month in operating costs, according to G. Bennett, chief of motive power, shown here in front of the unit. The rectifier unit replaced two diesel generator sets and associated control panels in the railroad's main shop at Middletown, N.Y. The compact size of the rectifier enabled the railroad to put the new unit in just half the space needed for the old equipment.

The rectifier rating was closely figured to the power requirements of the shop to obtain maximum savings. Because it has sufficient overload capacity to handle peak load, the installed capacity did not have to be as great as that of the old equipment. The biggest saving results from the fact that the new equipment does not require the constant presence of operating personnel •

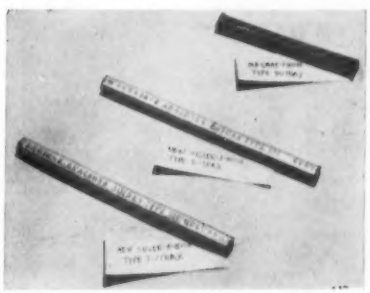
Heavy-Duty Lift Trucks

Two heavy-duty lift truck models introduced by the Hyster Company, 2902 N.E. Clackamas street, Portland 8, Ore., are Models XA-60 and ZA-80. Both are gasoline-engine powered and mounted on pneumatic tires with rear-wheel steering.

Designed primarily as an outside truck, the 8,000-lb capacity ZA-80 can be operated indoors as well. Special attention was given to operator comfort, ease of daily servicing and safety. Other outstanding features are short overall length (117⅜ in. without forks) and long wheelbase (76 in.). Standard lift height is 9 ft, with optional heights from 6 to 16 ft. Overall width is 51¾ in., top speed 10.9 mph, and inside turning radius 43½ in.

The XA-60 model is a 6,000-lb capacity version of the ZA-80, incorporating all its features, but with shorter wheelbase (65 in.), width (51 in.) and overall length (106⅜ in.). Top speed is 12.5 mph and inside turning radius is 36½ in.

Both trucks have a 12-in. dry plate clutch which can be replaced in less than an hour without removing the engine or transmission, and large heavy-duty disc-type industrial brakes •



Easy-to-Pull Electrical Cable

Installation of non-metallic-sheathed cable has been made easier by a smoother, cleaner surface on a new electrical cable called Silver Dutrax, made by the Anaconda Wire & Cable Co., Hastings-on-Hudson, N.Y. The manufacturer says it can be pulled through joists with half the effort necessary with ordinary non-metallic-sheathed cable, and without soiling hands or wall surfaces.

Low temperature characteristics of the cable were investigated by storing it for three days at temperatures ranging from zero to minus 25-deg F. The cable was then pulled through wooden joists at zero without difficulty.

The cable strips easily and its smooth outer finish allows easy fishing. The small diameter is said to make it especially good for wiring in existing buildings. It is available in twin-conductor in sizes Nos. 14 to 8 and in 3-conductor round, in sizes Nos. 14 to 6. Standard lengths are 250-ft coils for sizes Nos. 13, 12 and 10, and 125-ft coils for sizes Nos. 8 and 6 •

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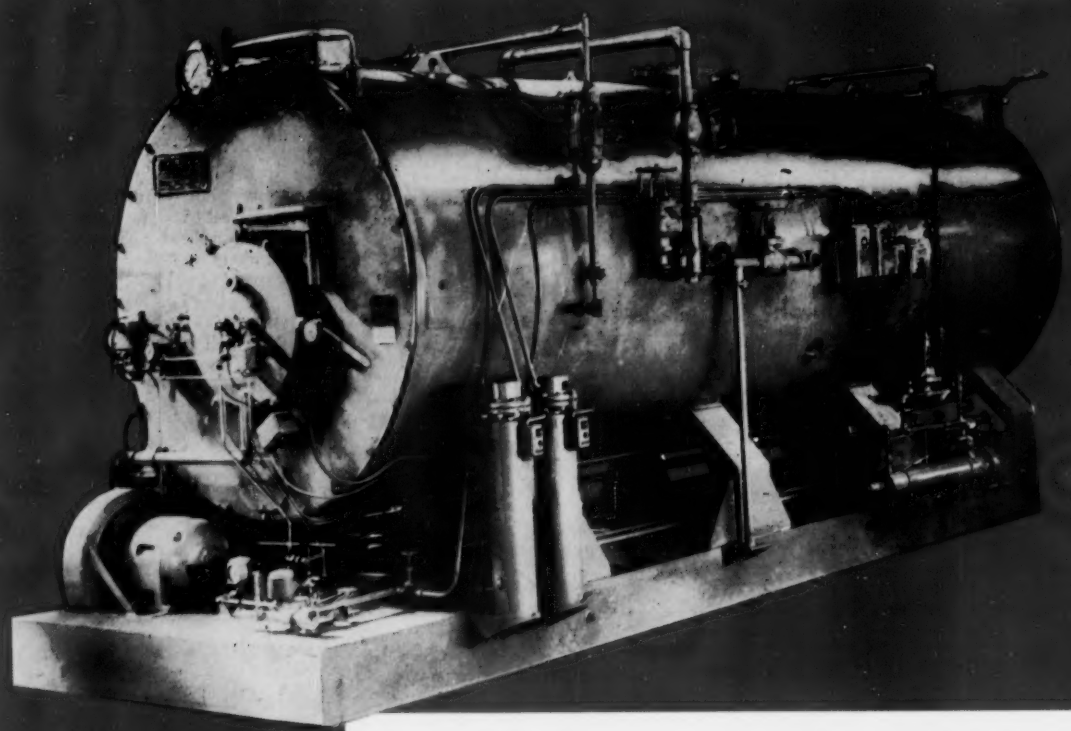

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- Delivered complete — ready for service connections
- Product of Ames Iron Works, with a continuous record of quality boiler production for more than 100 years

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